VIC C-64 PET

The Monthly Journal for Commodore Computer Users

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COMMANDER

SEPTEMBER 1983

Inside:

- TELL TIME ON THE VIC-20
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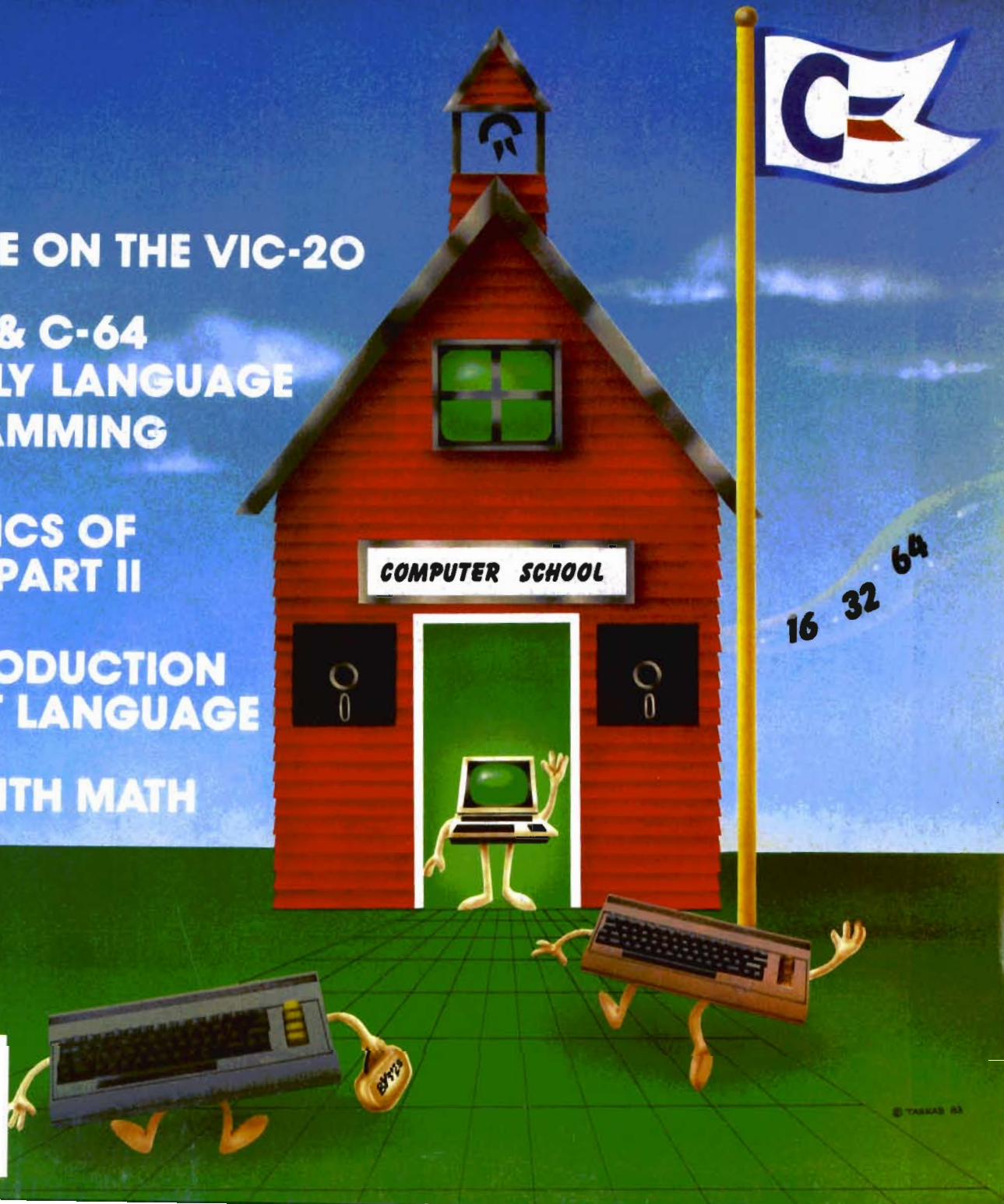
- THE BASICS OF BASIC—PART II
- AN INTRODUCTION TO PILOT LANGUAGE
- DRAW WITH MATH



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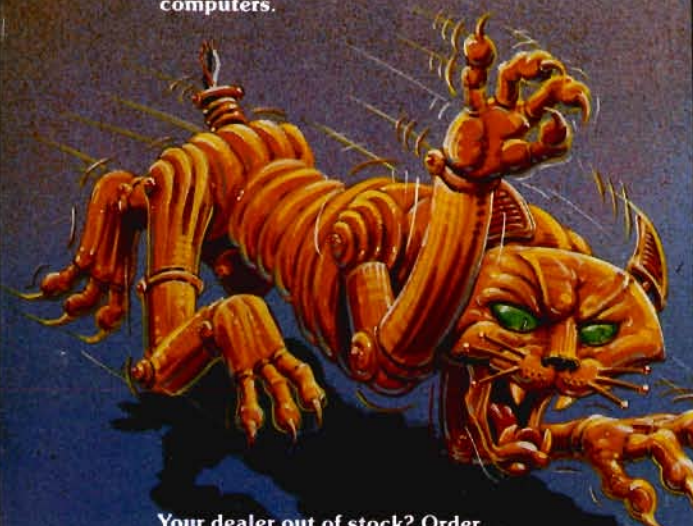

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Circle No. 52

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COVER BY: Randy "Tarkas" Hoar

"Commodore Goes to School"
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The Education Boom — Or Bust?

A recent survey published by Time magazine showed that 51% of all personal computer software manufacturers had a "game" in their line of products. This is not really much of a surprise since everyone knows that all computer software manufacturers are only interested in making games—RIGHT? Wrong—the same survey also showed that 46% of the manufacturers produced some kind of educational program! Surely within one or two years the educational sector of the market will have surpassed the game market as the predominant force in the personal computer software arena.

The increase in availability of educational software is a natural progression of personal computer evolution. At first, very few good programmers were available for personal computers so they programmed games because they were fun. Then, as more programmers moved into the field, competition became more intense and programmers were forced to provide what the users wanted instead of what they thought the users should want. The rapid decrease in price of the personal computer brought millions of first-time users with it and these newcomers wanted something "useful" for their new computers to do. The logical step was into education and the computer manufacturers are jumping on the bandwagon in a very big way. Commodore, IBM, Tandy and the other "biggies" are applying a lot of pressure to their programmers to produce educational software and offering huge discounts to school districts to induce them to buy their computers.

The educational establishment of the U.S. seems to have caught "computeritis". There is an unbelievable push to teach our kids about computers and the rallying cry is "computer literacy". To be sure, the technology produced by the electronic revolution seems to be the natural path for our economy to follow and if such is the case there will be a need for hundreds of thousands of people to design, develop and maintain the technology and its offspring.

So the word has come down from on high—"Thou shalt be computer literate". The pressure is on and the school districts are reacting. I pray that the results will be better than the previous efforts which have given us a generation of citizens who cannot spell or do arithmetic without a calculator but I fear it will. Policies and plans are being developed by people who have never even used a personal computer and have no desire to learn anything about them. There are virtually no teachers trained or available to teach computer technology in the primary and secondary school system and no sign of a change from this situation for many years to come.

The gauntlet has been flung and we must answer the challenge. But how? The reasonable approach would be "Computer, teach thyself". Let the computer do all of the work through software. But today's programmers are writing good software and the good teachers can't program. Hmmm...I wonder what the answer is. Let's get on the stick, programmers and teachers, and make some top notch, high quality educational programs. Let's get together and make sure that the promise offered by the personal computer doesn't go bust.□

Letters

Man Bytes Computer

Dear Colin,

Years ago, when I was a graduate student, I happened to visit the University computer center. To be quite candid, I have never been so completely and totally intimidated by a machine in my life! So for all these years I have resisted any temptation to even become mildly associated with computers. Then I saw my first VIC-20 about a year ago and I remember thinking to myself, "...a computer that size could not possibly be vicious. And if it is, I am still bigger than this machine.....I can always smash it before it charges me...." So here I sit in front of my VIC with full expansion, 40/80 adapter, disk drive, Gemini 10 printer, and Quick Brown Fox (thanks to your column in COMMANDER).... Evolution works.....!

I do enjoy your column and among other things, you have a wonderful style which a rank novice (like myself) can read and not be confused with buzz talk and hacker rhetoric—God bless you for that much alone.

I have purchased TOTL.LABEL and it is all you said it would be. I just received my PRACTICALC and eagerly wait to read your review. I am not sure how I can adapt PRACTICALC to my needs. I have no need for a business spreadsheet, but I am sure it can be used for a great many jobs—Please give your readers some ideas on other uses of a spreadsheet rather than the usual office-sales-projection applications. We beginners NEED to be hand-fed and our diapers changed until we "grow up" (soon I hope).

Again, keep up the excellent job you are doing.

Sincerely yours, Joel R. Crabbe

Dear Joel,

Thanks for your supportive letter. I try to explain each kind of program before I review an example. It sounds like we come from similar backgrounds. I repaired computers for 15 years and actively avoided them in my off hours. The VIC is my third micro, and my favorite.

I noted with interest your mention of a 40/80 card. I have the Data 20 64K Video Pak. In future columns, I will report how each piece of software works with this device. Practicalc will not work. I've talked with Sandy Ruby about it, but he said it would be too complex to change. Sandy will soon have some templates available for PractiCalc. You should write for information. Totl.Label will work with 80 columns, but the version you have may have problems. A fix is available, for free, from TOTL.

I don't know exactly what you use your VIC for, but I have a lot of software and hardware under review that you might be interested in. In September, the column's format will change. I'll be writing about three or more items a month, instead of only one. I've enclosed the latest VIC List. It is done on Totl.Label now, but I'm changing it to a new Database program called Flex File. FF is the only "complete" database for the VIC now. At $110 it's not cheap, but it is the best.

Thanks again for your letter, and if I can answer any questions, just write.

Sincerely, Colin

If you have any questions or comments for the editors of Commander please write to:

LETTERS
P.O. Box 98827
Tacoma, WA 98498

Telecommander

by Donald L. Stoner

You'll never guess how I got "hooked" on the VIC-20. Forgive me, but I've been a TRS-80 user since the Model I was first introduced.

About a year ago, however, I needed a low cost computer to use as a communications terminal. The primary application was to send electronic mail to the Source and CompuServe. Dan, the heir to the Stoner fortune, was using my main computer constantly for his school homework. Most evenings, fate decreed that we both needed the computer at the same time.

The low cost of the VIC-20 seemed a small price to pay for maintaining peace and tranquility in the Stoner household. Shortly after the transaction was consummated at the local K-Mart, I began shopping for a modem to use with the VIC. The Commodore modem was out of the question. I live in the General Telephone service area and their telephones do not have handset connectors.

Several modems can be used with the VIC-20 without requiring the Commodore RS-232 interface. For those not familiar with the RS-232 specification, it mandates that the data signals (between the computer and modem) vary from more than minus 3 volts (a one) to more than plus 3 volts (a zero). The VIC (and 64) user port is called TTL (transistor-transistor logic) compatible; that is, the data signal varies from plus 5 volts (a one) to zero volts (a zero).

There are no modems on the market that are directly TTL (and VIC) compatible with the exception of the Commodore product. To use a conventional modem, it is necessary to reverse the polarity of the TTL signal; that is, make a "one" zero volts and a "zero" equivalent to five volts. This was done by constructing a simple circuit (see Figure 1) using transistors for polarity inversion.

The modem I selected (The MicroConnection from The Micro-Peripheral Corp., 2565 152nd Ave. N.E., Redmond, WA 98052) has provision for 0-5 volt (instead of RS-232) data signals by adding a jumper to the DB-25 data connector. As a result, the MicroConnection can be easily interfaced to the VIC and 64 and works like a "charm".

If you want to go "first cabin", the MicroConnection even has an autodial, autoanswer option. The money I saved by not buying the Commodore RS-232 adapter paid the cost of this option. My VIC-20, with only 3585 bytes of memory, will now dial other computers automatically from the keyboard. With suitable software and additional memory, the VIC and MicroConnection could also be used to make an inexpensive bulletin board system (BBS) with in-memory messages.

Interfacing the VIC-20 to the MicroConnection was a simple task with a little assist from Radio Shack. The MicroConnection has a female DB-25 data connector on the rear panel, while the VIC-20 (and 64) require a 24 contact card edge connector (two rows of 12, called a 12/24). A small perforated construction board was used to mount the interfacing components (see photo—Figure 1).

Finding the mating male DB-25 connector was easy. It is Radio Shack part number 276-1559. However, Radio Shack does not stock a 12/24 pin card edge connector. I solved the problem by purchasing one of their 25/50 connectors (part number 276-1545) and cutting it in half. A small piece of plastic was glued over the open end so the connector could not slide back and forth on the card edge. The contacts on the connector must match the card edge conductors on the VIC-20 as closely as possible. This modified connector was epoxied to a piece of "perf board" measuring 2.5 x 2.5 inches. Figure 2 shows a rear view of the connector as described on page 283 of "VIC-20 Programmers Reference Guide". This is the same view you would see looking at the card edge from the back of the VIC-20. Ignore the pin numbers and letters stamped on the connector you modify. Instead, assign the designations shown in

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Figure 2. The numeric row is on the top row while the alpha pins are on the bottom. Note that the pins in the alpha row do not follow an exact A-B-C sequence. When you epoxy the connector to the "perf board", make sure the alpha row is closest to the board. The top and bottom are in the same position as shown in Figure 2.

Figure 1 shows a pictorial drawing of how the interface components are assembled. The circuit consists of three transistors and four resistors. If your modem does not have the autodial auto-answer option, you can eliminate transistor Q2, plus its associated resistor along with the "H" connection to the VIC and the wire to pin 8 of the DB-25 connector. The wire between pin 20 of the DB-25 connector and the "E" pin to the VIC can also be eliminated.

To make the modem cable sturdy, wire terminations were placed at the edge of the board. This was done by looping a short length of bare tinned wire through a couple of holes. This provides a good junction between the components on the board and the five wires that go to the DB-25 connector. To further insure that the wires don't come loose, a plastic "tie wrap" was used to lash the cable wires to the board. Don't skip this step because, sooner or later, flexing of the wires will cause one to break where it connects to the board.

Note the wire between pins 4 and 7 on the DB-25 connector. This connection puts the MicroConnection in the autodial mode. If you use the modem in an auto-answer application, this wire should be removed. The connection between pins 1 and 7 is required to insure the MicroConnection works with TTL level signals.

The three transistors are 2N2222 general purpose NPN types. Virtually any NPN small signal transistor can be used. The MPS2222 stocked by Radio Shack (part number 276-2009) works perfectly. The 22K ohm resistors are their part number 271-1339 (a package of five for 39 cents).

The five wire cable may present a problem. Radio Shack has antenna five conductor rotor cable but only in 100 foot lengths. You can probably "scrounge" a piece from a friend who is into electronics or make one up by twisting five different colored wires together.

The total cost for the components is about $12.00, assuming you already have the epoxy, bare wire, and tools such as a soldering iron. For those of you not into "home brew" construction, the complete interface (wired and tested on an epoxy circuit board) can be purchased for $24.95 from ByteSize Computer Products, P.O. Box 21123, Seattle, WA 98111.□

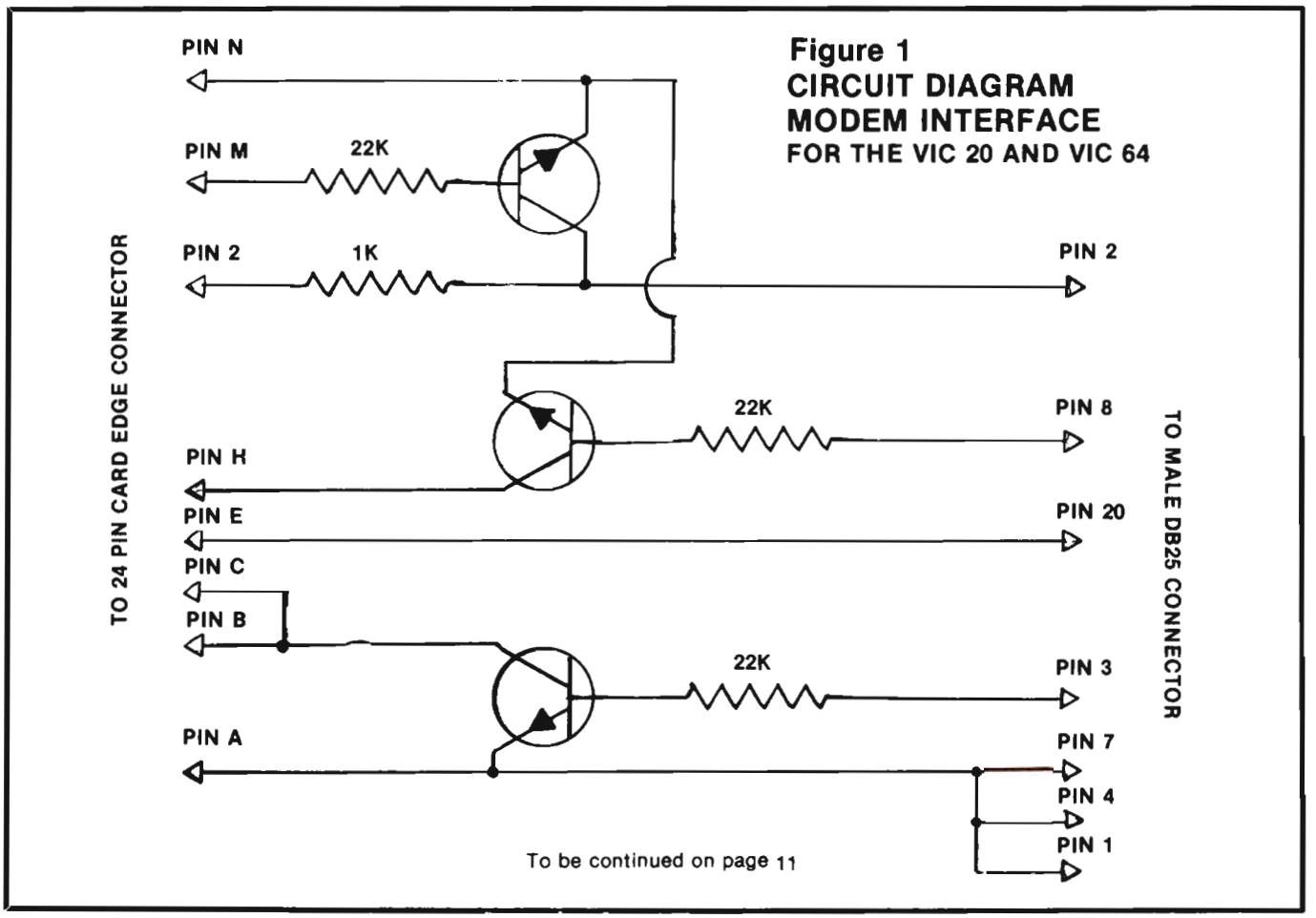

Figure 1
CIRCUIT DIAGRAM
MODEM INTERFACE
FOR THE VIC 20 AND VIC 64

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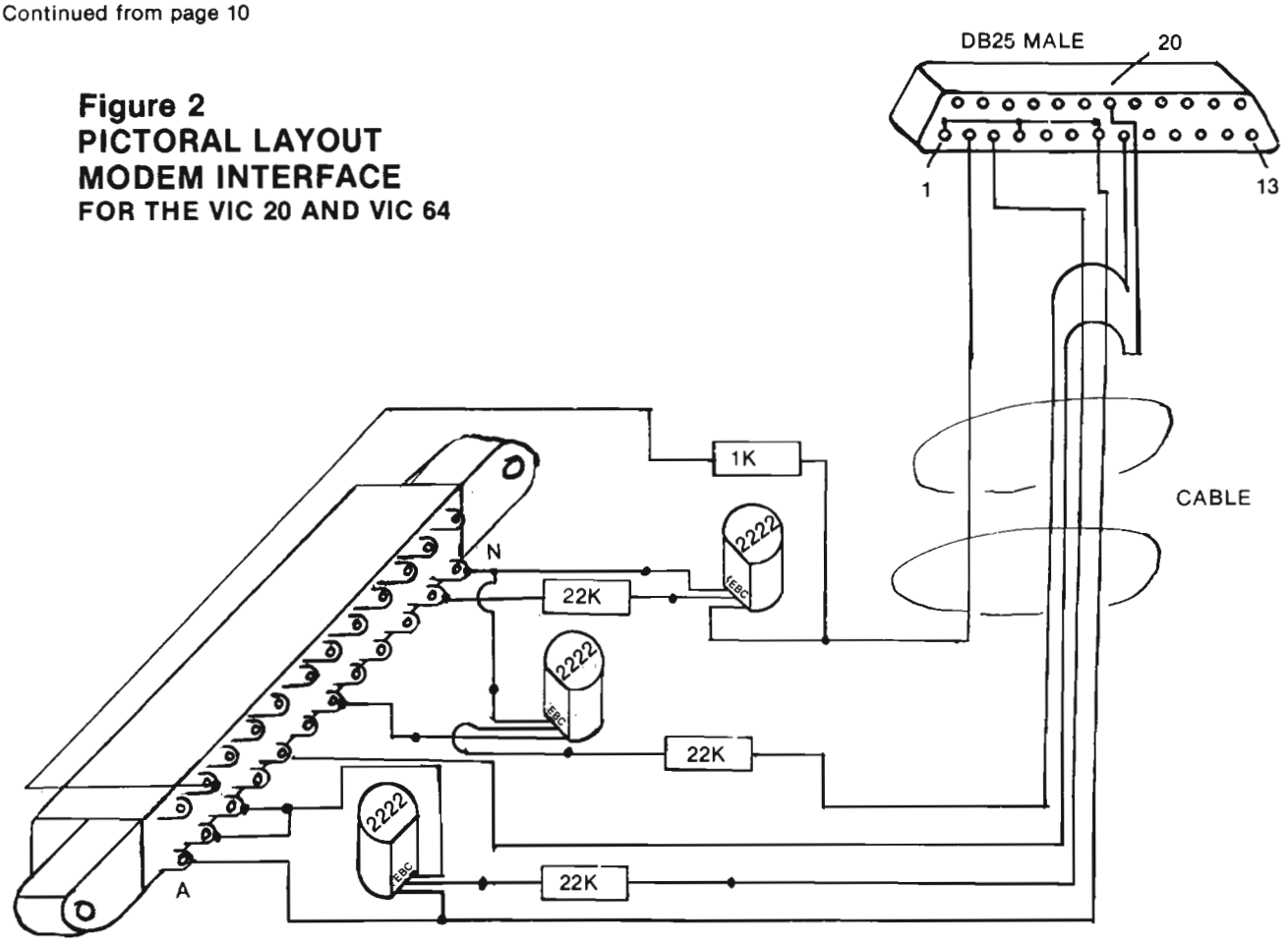
Figure 2
PICTORAL LAYOUT
MODEM INTERFACE
FOR THE VIC 20 AND VIC 64



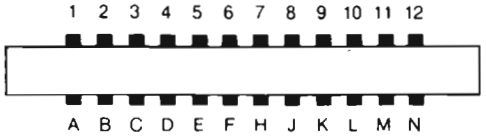
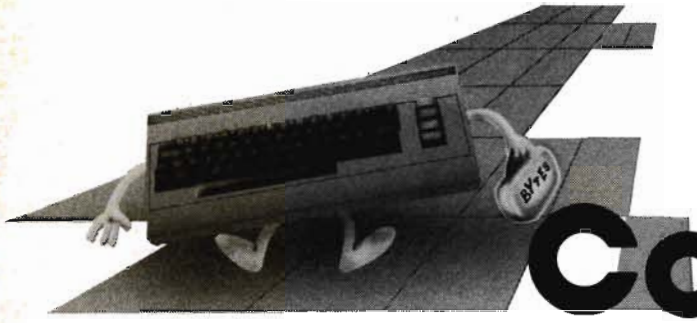


Figure 3
TEN ASSIGNMENTS
FOR THE USER
1/0 PORT

PIN #	TYPE	NOTE	PIN #	TYPE	NOTE
1	GND		A	GND	
2	+5V	100mA MAX.	B	CB1	
3	RESET		C	PB0	
4	JOY0		D	PB1	
5	JOY1		E	PB2	
6	JOY2		F	PB3	
7	LIGHT PEN		H	PB4	
8	CASSETTE SWITCH		J	PB5	
9	SERIAL ATN IN		K	PB6	
10	+9V	100mA MAX.	L	PB7	
11	+9V		M	CB2	
12	GND		N	GND	

PIN ID	6522 ID	DESCRIPTION MODES	IN/ OUT	EIA ABV	
C	PB0	RECEIVED DATA	IN	(BB) Sin	1 2
D	PB1	REQUEST TO SEND	OUT	(CA) RTS	1*2
E	PB2	DATA TERMINAL READY	OUT	(CD) DTR	1*2
F	PB3	RING INDICATOR	IN	(CE) RI	3
H	PB4	RECEIVED LINE SIGNAL	IN	(CF) DCD	2
J	PB5	UNASSIGNED	IN	( ) XXX	3
K	PB6	CLEAR TO SEND	IN	(CB) CTS	3
L	PB7	DATA SET READY	IN	(CC) DSR	2
B	CB1	RECEIVED DATA	IN	(BB) Sin	1 2
M	CB2	TRANSMITTED DATA	OUT	(BA) Sout	1 2
A	GND	PROTECTIVE GROUND		(AA) GND	1 2
N	GND	SIGNAL GROUND		(AB) GND	1 2 3



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Introduction to Pilot

An Exclusive Instructional Aid By the Author of Vanilla Pilot

Richard F. Daley, Ph.D.

In educational computing circles today you hear and read about terms like 'authoring languages' or sometimes PILOT. This article will introduce you to these two terms and their meaning. In addition, an introduction to programming in PILOT will be given.

Authoring languages in innumerable variations are found as a part of many computer installations. The main point of each of these languages is that they can be used by teachers who want to write computer assisted instruction, but don't want to learn the inner workings of a typical computer language. Unfortunately, most are failures. They become much too complicated for anyone but computer professionals to use.

PILOT, developed to be used as an authoring language, avoids the pitfalls of most other implementations. It is best used in the development of interactive dialog program, conversational games, or, in modern enhancements of the language, with added turtle graphics features.

I am frequently asked "Why use PILOT?" There are many, many computer languages from which to choose. Every computer language has some specific features which make it ideal for certain types of tasks. Most microcomputers have languages like BASIC, FORTRAN, COBOL, LOGO, APL, and ASSEMBLER available. All of these languages can be used to write interactive dialog programs. However, PILOT is a specialized language designed for dialogs, drills, and tests rather than the computation handled well by general purpose languages.

BASIC, for example, can handle a free response dialog, but the programmer must often make unwieldy arrangements for processing input and for comparing words or portions of words that the program must recognize.

Before proceeding look at the term 'free response dialog'. Understanding this term can help us in understanding how the PILOT language can be used. To illustrate free response dialog, look at this simple example:

```
THE WEATHER FORECAST
FOR TODAY HAS A 100%
PROBABILITY OF
PRECIPITATION.
WHAT WILL WE SEE:
BLUE SKY, CLOUDS, RAIN,
SUNSHINE
```

As you can see there are two possible correct responses from the list of weather types. Precipitation is synonymous with rain and, if it rains, there are clouds. So any program written to work with this concept must look for BOTH responses and handle each appropriately.

From the programmer's viewpoint, it is easier to require the user to enter one word replies like RAIN or CLOUDS. From the students viewpoint an answer such as:

```
IT WILL LIKELY BE CLOUDY
AND RAIN.
```

is much easier to work with. It is more natural—like a conversation. As shown by this example, free response dialog allows the user to respond to the computer in a normal conversational manner.

Ideally, the language used in developing an interactive dialog, will handle such an interactive dialog efficiently and easily. This rules out most languages, including BASIC, as they use slow, complex program structures to accomplish this.

The PILOT language is designed to take the pain out of writing an interactive dialog program. With PILOT, just as with a spoken language, you can express many ideas and accomplish many tasks by combining a handful of simple statements.

Tamarack Software, Inc. markets a version of PILOT, called Vanilla Pilot, for all Commodore computers currently on the market. I suggest you obtain a copy of Vanilla Pilot, a bargain at

its suggested retail of only $29.95, from your local computer store before continuing this article. It will help you appreciate the power and ease of use of the PILOT language.

There are four types of PILOT statements which make up the majority of most PILOT programs. In fact, you can write programs of considerable complexity using only these four statement types. Look at each of these statements:

The first statement is the TYPE statement. It is much like the PRINT statement in BASIC. It's function is to display, or TYPE, information onto the computer screen. The format of this, and any other, PILOT statement is

T:

If you wish, for example, to display the word HELLO on the computer screen, the TYPE statement would look like this:

T:HELLO

When you run this PILOT program line the word HELLO will be displayed on the screen.

All PILOT program lines have about the same format. This format consists of four separate parts. Each program line needs a line number. A line number may be any whole number between 0 and 63999. The line number is followed by a PILOT statement or command. These statements consist of a single character (like the T for TYPE). Next there is a colon. The colon is a separator between the PILOT statement and the operation field, or operand, which is the fourth part of a PILOT program line. Thus the TYPE statement shown above is incomplete. It would be better like this:

100 T:HELLO

The next PILOT statement is the ACCEPT command. The ACCEPT command takes input or information from the keyboard while the program is executing or running. When the computer comes to an ACCEPT command,

LISTING 1

```
100 T:THE WEATHER FORECAST FOR TODAY
110 T:HAS A 100% PROBABILITY OF
120 T:PRECIPITATION.
130 T:
140 T:WHAT WILL WE SEE:
150 T:BLUE SKY, CLOOUDS, RAIN, SUNSHINE
160 A:$
170 T:
180 M:CLOUD
190 TY:YES!! IT WILL BE CLOUDY.
200 M:RAIN
210 TY:RIGHT, PRECIPITAION MEANS RAIN.
220 M:CLOUD,RAIN
230 TN:ARE YOU SURE ABOUT THAT?
240 E:
```

LISTING 2

```
100 *START T:THE WEATHER FORECAST FOR TODAY
240 T:WANT TO TRY AGAIN?
250 A:$
260 M:YES,Y,OK,SURE,YEP,FINE,GREAT
270 JY:START
280 E:
```

LISTING 3

```
100*STARTT  :THE WEATHER FORECAST FOR TODAY
110        T  :HAS A 100% PROBABILITY OF
120        T  :PRECIPITATION.
130        T  :
140        T  :WHAT WILL WE SEE:
150        T  :BLUE SKY, CLOOUDS, RAIN,SUNSHINE
160        A  :$
170        T  :
180        M  :CLOUD
190        TY:YES!! IT WILL BE CLOUDY.
200        M  :RAIN
210        TY:RIGHT, PRECIPITAION MEANS RAIN.
220        M  :CLOUD,RAIN
230        TN:ARE YOU SURE ABOUT THAT?
240        T  :WANT TO TRY AGAIN?
250        A  :$
260        M  :YES,Y,OK,SURE,YEP,FINE,GREAT
270        JY:START
280        E  :
```

LISTING 4

```
100 G:CLEAR
110 G:COLOR 2
120 G:GOTO 20,20
130 G:DRAW 40
140 G:RIGHT 144
150 G:DRAW 40
160 G:RIGHT 144
170 G:DRAW 40
180 G:RIGHT 144
190 G:DRAW 40
200 G:RIGHT 144
210 G:DRAW 40
220 G:RIGHT 144
230 E:
```

LISTING 5

```
100          G :CLEAR
110          G :COLOR 2
120          G :GOTO 20,20
130          U :SIDE
140          U :SIDE
150          U :SIDE
160          U :SIDE
170          U :SIDE
180          E :
190 *SIDE    G :DRAW 40
200          G :RIGHT 144
210          E :
```

LISTING 6

```
100          G :CLEAR
110          G :COLOR 2
120          G :GOTO 20,20
130          C :E=5
140          C :T=0
150 *LOOP    U :SIDE
160          C :T=T+1
170          C :$=T
180          M :#E
190          JN:LOOP
200          E :
210 *SIDE    G :DRAW 40
220          G :RIGHT 144
230          E :
```

it stops and waits for you to type something on the keyboard. There are a number of options for the operation field of the ACCEPT command in Vanilla Pilot; one is:

A:$

When the computer sees the dollar sign ($), it ACCEPTs input from the keyboard, then transfers it to a section of memory called the 'ANSWER FIELD'.

The third PILOT statement is the MATCH command. Here the PILOT program makes decisions. Complex pattern matching is done on the user input stored in the ANSWER FIELD. The program then makes decisions based on whether or not a match was found.

The MATCH command contains a list of patterns to be searched for and matched with the input information stored in the ANSWER FIELD. For example,

M:TEST,EXAM

Suppose you wish to search the user input for the words TEST or its synonym EXAM. The MATCH command works by using what is called a 'sliding window' match. That means that each of the patterns in the MATCH statement are scanned across the contents of the ANSWER FIELD. Thus, the word TEST found in the above MATCH statement would match with the sentence

THAT WAS A TOUGH TEST
WE HAD TODAY!

or the word EXAM in the sentence

WE HAVE A HISTORY EXAM
TOMORROW.

The 'sliding window' match will match with the set of characters contained in the ANSWER FIELD no matter where they appear.

There are only TWO possible outcomes of the MATCH. Either a match will be found or one will not be found. That is either YES or NO. The MATCH statement will communicate with the rest of the PILOT program using a memory location called the Yes/No flag.

The Yes/No flag is important. Each PILOT statement type can

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have either a Y or a N between the command letter and the colon. The Y and N are conditionals and the statement will be executed ONLY if the conditional is the same as the Yes/No flag. For example,

```
TY:WE WILL HAVE A
   TEST TOMORROW!
```

The sentence following the colon would only be typed if the Yes/No flag were set to YES. If the Yes/No flag were set to NO then this statement would be skipped.

The final PILOT statement is the

```
E:
```

or END statement. The END statement is the last program line executed by the PILOT program. It may come at any point in the program, but must be the last line executed by the program.

To pull this all together study the simple example of a PILOT program shown in Listing 1. If you have a copy of Vanilla Pilot available, load it and enter the program in Listing 1 into your computer. Based on what we have already talked about, study the listing for yourself to see if you understand the program.

Lines 100 to 150 of the program are simply TYPE statements. The computer will display these lines on the screen as

```
THE WEATHER FORECAST
FOR TODAY HAS A 100%
PROBABILITY OF
PRECIPITATION.
WHAT WILL WE SEE:
BLUE SKY, CLOUDS, RAIN,
SUNSHINE
```

At this point the program will be waiting at line 160 for an entry from the keyboard. Remembering the 'sliding window' of the MATCH statement, enter a sequence answer. For example,

```
I EXPECT TO SEE SOME RAIN.
```

When you press the RETURN key the computer takes the sentence you typed on the keyboard and places it in the ANSWER FIELD. Next, it checks for the match for the word CLOUD in line 180. There is no match, so the TY: in line 190 will not be executed.

There is a match with the word RAIN in line 200, so the computer will TYPE the words:

```
RIGHT, PRECIPITATION
```


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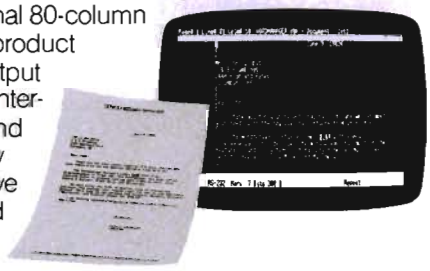

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MEANS RAIN.

Try it!

Now RUN the program again. This time enter the words

I WILL SEE CLOUDS.

This time when you press RETURN the computer will test the input against the MATCH in line 180. The matchstring CLOUD matches with CLOUDS in the input. So the computer will respond:

YES!! IT WILL BE CLOUDY.

A word about lines 220 and 230. The MATCH in line 220 checks the contents of the ANSWER FIELD to see if either RAIN or CLOUD appears, if neither word is there, then the Yes/No flag is set to NO. This allows the TYPE statement in line 230 to be executed. Thus, if neither RAIN nor CLOUD appears in the ANSWER FIELD the computer will respond:

ARE YOU SURE ABOUT THAT?

Try one final test of the program. What do you expect will happen if you enter a sentence with BOTH the words CLOUD and RAIN in it?

Decide what you would expect, then try it! Type RUN, then enter the following sentence

IT WILL PROBABLY BE
RAINY AND CLOUDY.

You should have successfully predicted that BOTH responses

YES!! IT WILL BE CLOUDY.

and

RIGHT, PRECIPITATION
MEANS RAIN.

would be displayed.

At this point, many of you are probably tired of typing RUN every time you wish to try another entry in this program. Here's how to modify Listing 1 so you can loop back to the start if you wish to try again.

Begin by entering the program lines shown in Listing 2. LIST the program and notice that the old line 100 has been replaced by a new line 100. This new line contains a label. A label is a way of NAMING a program line. The label, *START, tells the computer that this program line is special. Whenever you tell the computer to search for a label, it looks through your program until it finds the correct label. When the label is found, the program begins executing that program line.

Until now all the program lines you have looked at have been executed in numeric order. Labels in a PILOT program transfer control to different parts of a program as needed.

The other part of the transfer of control is found in the new line 270. This part is the J: or JUMP command. Here you JUMP to the label START, if the Yes/No flag is set to YES. And the Yes/No flag is set to YES, when the input from line 250 contains one of the affirmative answers from the MATCH statement in line 260.

When writing your own programs in Vanilla Pilot, there are two things you need to watch for. These are

1. Be sure you have a label for every J: statement for the proper transfer of control.
2. Be sure you have only one possible destination label for each JUMP statement. The routine to search for a label will look at the same number of characters in the label as there is following the colon of the JUMP statement. That is—J:TEST will find the labels *TEST, *TESTING or *TEST5. Thus, if the label *TEST comes after either *TESTING or *TEST5, you will never reach that line with a JUMP.

There is a variation of the LIST command you have been using in Vanilla Pilot. Try using the command LLIST (Yes, there really should be two L's). You should see a listing on the screen of your computer that looks like Listing 3. By the way, PLIST sends the output to your printer.

Now for a look at the Turtle Graphics features of Vanilla Pilot. Turtle Graphics means that the computer has an 'invisible' turtle with a pen. On a computer like the Commodore-64, the turtle actually carries a set of 16 different colored pens. One corresponding to each of the various colors that the computer is able to display.

The Turtle Graphics is accessed by the GRAPHICS command G:. The G: command has a number of sub-commands which tell the computer which of the graphics options to do.

In this article, you will look at some of the GRAPHICS sub-commands used on a computer like the Commodore-64. These commands also apply to the VIC-20, 4032, and 8032 versions of Vanilla Pilot. The VIC-20 version has 8 colors and the 4032 and 8032 versions have no color capabilities.

In the Turtle Graphics system, the computer screen becomes the playground for a tiny invisible turtle, with the turtle at the center of an invisible circle that moves with him. This circle is divided into 360 segments or angles, each measuring one degree. The turtle can face into any one of these segments.

The turtle's position on the screen is determined by a system of coordinates. The top left hand corner of the screen is 0,0 while the bottom left hand corner, except on a VIC-20, is 0,49. With a 40 column screen the center of the screen is 39,24 and the coordinates for the upper right corner are 0,79.

Following is a description of seven graphics sub-commands for Vanilla Pilot. They are CLEAR, COLOR, DRAW, GOTO, DIRECTION, LEFT, and RIGHT. There are several additional sub-commands, but these will be left for you to learn from your Vanilla Pilot manual.

The CLEAR sub-command initializes the turtle. It accomplishes, among other things, moving the turtle to location 0,0 and setting its direction and color to 0. Always begin your Turtle Graphics program with a CLEAR.

With the COLOR sub-command you can control the color of the pen the turtle is carrying. You need to specify a color number, c, from 0 to 15 on the Commodore-64 (0 to 7 on the VIC-20).

Using the DRAW z sub-command, you can DRAW a line z units long across the screen. This line is drawn using the current pen color and the turtle's current direction.

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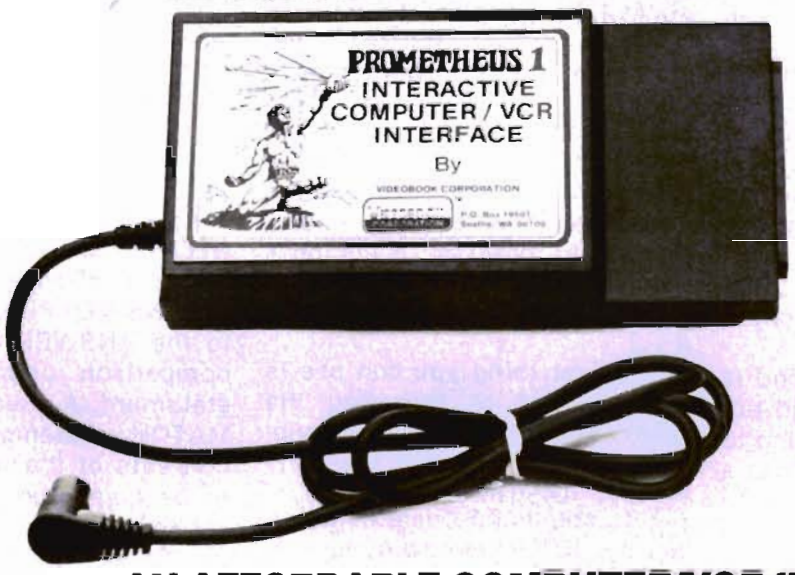

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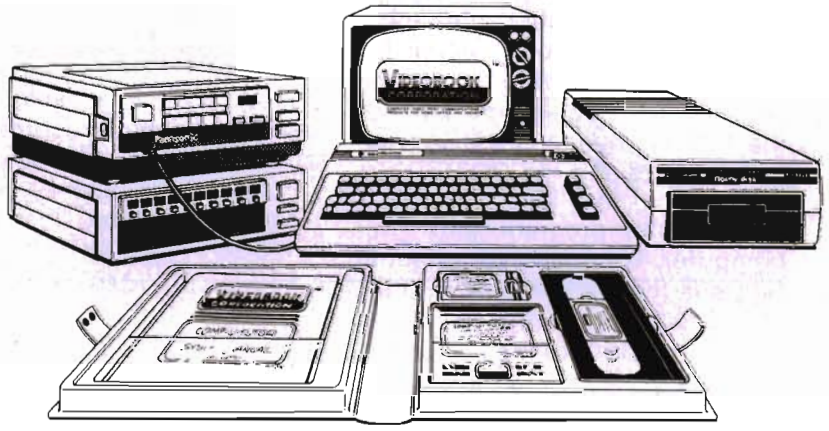

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The GOTO x,y sub-command places the turtle at locations x,y in the coordinate grid of the screen.

Change the direction the turtle is heading using the DIRECTION d. The value of d is in degrees and can be any value between 0 and 359. Direction 0 is facing to the right side of the screen. The value of the direction increases in counter-clockwise fashion.

The LEFT d sub-command adjusts the heading of the turtle by d degrees to the turtle's left. This is different from the DIRECTION sub-command in that the change of direction is relative to the current direction. That is, if the turtle is facing 0 degrees then a LEFT 90 will turn the turtle left (counter-clockwise) to 90 degrees.

The RIGHT d sub-command is like the LEFT sub-command but will adjust the turtle's heading to the right (or clockwise). Thus, a RIGHT 90 will turn the turtle to 270 degrees.

Now look at a simple example of a Turtle Graphics program. The program in Listing 4 is designed to work on the Commodore-64 computer. The other Commodore computers will require some adjustments to run properly. For the 4032 and 8032 delete line 110. For the VIC-20 change the DRAW 40 to DRAW 25 and the GOTO 20,20 to GOTO 10,10.

Enter the program into your computer. Try to deduce what the figure is that will be drawn. Lines 100 to 120 simply initialize the turtle, set the color of his pen to color 3 (cyan) and locate the starting point of the first line at coordinates 20,20.

Remember that the turtle is facing to zero degrees or towards the right hand side of the screen. Draw a line 40 units long in that direction. Now the computer will turn to the turtle's (not your) right, or in a clockwise direction. This pair of actions is repeated four more times to complete the figure.

To check your prediction about the shape of the figure, Listing 1 shows the figure as you should see it on your computer screen.

Many people get tired of entering the same lines repeatedly in a single program. Like most computer languages, PILOT takes care of this drudgery using a sub-program which is called from within the main program. This sub-program is called a sub-routine in some computer languages. When the sub-program has accomplished its task, control is returned to the program line immediately following the statement which called the sub-program.

The start of a sub-program is marked with a label and the end is marked with E: or END statement. To visualize what this means, rewrite the program in Listing 4 using sub-programs. The result of this rewriting is shown in Listing 5.

The first thing you can see is that, instead of repeating the DRAW and RIGHT graphics sub-commands, we repeat the command U:SIDE

This command operates much like the JUMP command, but has one important difference. The USE command remembers its location in the program. As soon as the END command is found, control is returned to the program line immediately after the USE command. In this case, the program would be executed in the following line number sequence:

100	190	
110	200	190
120	210	200
130	140	etc.

Try it!

Vanilla Pilot also includes a command called TRACE. The TRACE command allows you to see each line at the top of the screen as it is being executed. To use the TRACE command type TRACE and then RUN. Watch the program lines as they appear on the screen.

When you wish to stop the TRACE function, simply type OFF.

Your first reaction in moving from Listing 4 to Listing 5 was probably that there is STILL a set of repeating lines. No self-respecting programmer would do this unless there was absolutely NO other choice.'

Well, Vanilla Pilot allows you to keep your self-respect! Eliminate these repeating lines by using the COMPUTE statement. The COMPUTE statement allows you to do arithmetic in PILOT. It takes the form of

C:expression

The expression is any equation including ONLY addition and subtraction. An example of this would be in line 150 of Listing 6. Here the expression is T = T + 1.

There is a reserved character used in the COMPUTE statement. It is the dollar sign ($). The expression, in the form

$ = expression

will be evaluated and the result of this evaluation will be placed in the ANSWER FIELD. This transfer to the ANSWER FIELD allows a comparison using the MATCH statement. A special form of the MATCH statement allows the contents of the ANSWER FIELD to be compared with a numeric variable.

Look at the program in Listing 6. It will do the same things as the programs in Listing 4 or Listing 5. However, there is no repetitive typing of the same lines. We are using a program structure called a LOOP. Lines 150 to 200 are the actual loop. A program loop is a set of program lines which are executed until some condition is met. In this case, when the variable T is equal to the variable E the loop will be terminated.

First the program draws a single line 40 units long. Next it adds 1 to the numeric variable T and transfers the new value to the ANSWER FIELD. Finally, in line 180 this value is compared to the contents of the numeric variable E. If there is not a match, then the loop is repeated with the JN:LOOP. These few lines can be used as a general looping calculation for any type of loop in PILOT.

This is a brief overlook of the PILOT language, using Vanilla Pilot from Tamarack Software for our examples. There is much, much more that you can do with the PILOT language. I hope that this overview will get you as excited about the PILOT language as I am.□

Math & Draw

by Ted Jean

An educational program for the Commodore-64 that rewards correct answers to math problems with drawing time using a joystick.

When I brought my Commodore-64 home, I didn't want it to turn into just another game machine. This time I wanted some educational value from it. On the other hand, "all work and no play, makes Johnny a dull boy". So, I was willing to compromise. I would spend a little time with education, and then, as an incentive, give an equal amount of time to recreation. These were the guidelines I used in developing "MATH AND DRAW".

First, I wanted the educational value for my two daughters. This was developed as math problems. Simple "ADDITION" problems for my first grader, and a little harder "SUBTRACTION" ones for the older, third grader.

Second, build the FUN part. This was to use the C-64 color capability for drawing. The idea of KISS (Keep It Simple Susie) came to mind, and I only used a low resolution technique for the screen. This turned out to be a plus with my six year old who would have been lost trying to draw with a high resolution screen.

Then, the final step was to connect the two. This gave the program a game environment. The person using the computer would be given five math problems. For each right answer, he would receive credit of one minute for drawing. After all five problems were done, the screen would clear. Then, by using a joystick, the student could draw or doodle with the computer. When time was up, it would be back to the chalkboard for five more problems. Again, he would receive credit towards drawing time for each correct answer.

My first program went to the experts for review (my two daughters). The response was good but with two complaints.

1) Saving the screen between math drills was very time consuming and boring.

2) "SUBTRACTION" was a big person's word. Their school used the term "TAKE-AWAY" instead.

Problem #2 was quick to solve; "SUBTRACTION" now reads "TAKE-AWAY". Problem #1 required me to remove the BASIC routine of PEEKS and POKES to save the screen and color memory with a machine language routine. Don't worry about understanding how it works. If you type it in carefully and avoid mistakes, it will work all by itself. (Briefly, it copies the 1k of SCREEN MEMORY starting at address 1024, and the 1k of COLOR NYBBLES from 55296 into the protected RAM area just above the BASIC ROM chip.)

With this done, the second program received much higher reviews from the two experts. So, here it is for your enjoyment.

Instructions

Five math problems are given using a Random Generator in lines 1010 and 1015. Two tries are allocated for each problem before the correct answer is displayed.

During drawing, pressing the fire button will TURN ON the square. Pressing the SHIFT key will TURN OFF the square. To erase multiple squares, press the SHIFT LOCK key.

Then, using the KISS technique again, I eliminated worrying about the CONTROL and COMMODORE keys for selecting the colors for the squares. You simply press the number keys 1 to 8 and the corresponding color will replace the current cursor color.□

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Continued from page 21

```
5 REM - * - * - MATH AND DRAW - * - * -
10 REM- * - * - BY  TED  JEAN - * - * -
15 REM************************************
20 REM*** BUILD SCREEN CONTROL TABLE***
25 DIM LINE$(25)
30 LINE$(1)=CHR$(19)
35 FOR A = 2 TO 25
40 LINE$(A) = LINE$(A-1) + CHR$(17)
45 NEXT A
50 REM************************************
55 REM***    SEND TITLE TO SCREEN    ***
60 POKE53280,5:POKE53281,7
65 POKE646,9:PRINT CHR$(147)
70 PRINT LINE$(5)SPC(12)"MATH AND DRAW"
75 PRINT LINE$(6)SPC(12);
76 FOR A=1 TO 13:PRINT CHR$(183);: NEXT
80 PRINT LINE$(9)SPC(7)"WHAT KIND OF PR
OBLEMS ?"
85 PRINT LINE$(14)SPC(5)"PRESS  +  FOR
ADDING PROBLEMS."
90 PRINT LINE$(16)SPC(5)"PRESS  -  FOR
TAKE-AWAY PROBLEMS."
95 PRINT LINE$(20)SPC(10)"YOUR CHOICE "
;
100 REM***********************************
105 REM***       CONSTANTS             ***
110 ZZ=1: SC=1024: CO=54272: CL=0
115 REM***********************************
120 REM***   BUILD JOYSTICK TABLE    ***
125 FOR A = 0 TO 10: READ XY(A): NEXT
130 DATA  0, -40, 40,   0, -1, -41
135 DATA 39,   0,  1, -39, 41
140 REM***********************************
145 REM***   BUILD KEYBOARD TABLE    ***
150 DIM KEY(64)
155 FOR A = 0 TO 64: KEY(A)=0: NEXT
160 KEY(08)=11: KEY(11)=15: KEY(16)=5
165 KEY(19)=6 : KEY(24)=7 : KEY(27)=8
170 KEY(56)=1 : KEY(59)=2
200 REM***********************************
205 REM*MACHINE LANGUAGE SCREEN MOVER**
210 AD=49152
215 READ X: IF X = -1 THEN 310
220 POKE AD,X: AD = AD + 1
225 GOTO 215
230 DATA 162, 4, 160, 196, 32, 30, 192
231 DATA 162, 216, 160, 200, 32, 30
232 DATA 192, 96, 162, 196, 160, 4
233 DATA 32, 30, 192, 162, 200, 160
234 DATA 216, 32, 30, 192, 96
235 DATA 142, 42, 192, 140, 45, 192
236 DATA 160, 4, 162, 0, 189, 0, 0
237 DATA 157, 0, 0, 202, 208, 247
238 DATA 238, 42, 192, 238, 45, 192
239 DATA 136, 208, 238, 96, -1
240 REM ... SYS(49152) = SAVE SCREEN
```

To be continued on page 24

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Continued from page 22

```
245 REM ... SYS(49167) = RESTORE SCREEN
300 REM*********************************
305 REM***        GET ANSWER           ***
310 POKE204,0:POKE198,0
315 PRINT"?"CHR$(157);
320 GET AN$:IF AN$ <> "+" AND AN$ <> "-
" THEN 320
325 POKE204,1
330 PRINT AN$
335 FOR A = 1 TO 1000: NEXT
400 REM*********************************
405 REM***  INSTRUCTIONS TO SCREEN   ***
410 POKE53280,8:POKE53281,5
420 POKE646,13:PRINT CHR$(147)
425 PRINT LINE$(4)SPC(8)"YOU WILL NOW G
ET 5 "
430 IF AN$="+"THEN PRINT LINE$(6)SPC(8)
"ADDING PROBLEMS."
435 IF AN$="-"THEN PRINT LINE$(6)SPC(8)
"TAKE-AWAY PROBLEMS."
440 PRINT LINE$(8)SPC(8)"FOR EVERY RIGH
T ANSWER,"
445 PRINT LINE$(10)SPC(8)"YOU WILL GET
1 MINUTE"
450 PRINT LINE$(12)SPC(8)"OF DRAWING TI
ME."
455 PRINT LINE$(16)SPC(12);
456 FOR A=1TO11:PRINT CHR$(175);:NEXT
460 PRINT LINE$(17)SPC(12)CHR$(18)" GOO
D LUCK "
465 PRINT LINE$(18)SPC(12);
466 FOR A=1TO11:PRINT CHR$(163);:NEXT
470 PRINT LINE$(23)SPC(6)"PRESS ANY KEY
 TO CONTINUE ";
475 POKE204,0:POKE198,0
480 PRINT"?"CHR$(157);
485 GET A$: IF A$="" THEN 485
490 POKE 204,1
500 REM*********************************
505 REM***   START OF MATH AREA      ***
510 PROB=1:TL=0
515 GOSUB 1000:TRY=0:REM  GET NUMBERS
600 REM*********************************
605 REM****    BUILD CHALKBOARD    ****
610 POKE53280,6:POKE53281,6
615 PRINT CHR$(147);CHR$(31);CHR$(18);
620 FOR A=1 TO 5
625 PRINT"
          ";:REM 40 SPACES
630 NEXT A
635 PRINT"          ";:REM 9 SPACES
640 PRINT CHR$(158)CHR$(109)"
          ";:REM 20 SPACES
645 PRINT CHR$(110)CHR$(31)"          ";
:REM 9 SPACES
660 FOR A=1 TO 10
```

```
665 PRINT"          ";:REM 9 SPACES
670 PRINT CHR$(158)" "CHR$(144);
675 PRINT"                    ";:REM 20
 SPACES
680 PRINT CHR$(158)" "CHR$(31)"
 ";:REM 9 SPACES
685 NEXT A
690 PRINT"          ";:REM 9 SPACES
695 PRINT CHR$(158)CHR$(110)"
          ";:REM 20 SPACES
700 PRINT CHR$(109)CHR$(31)"          ";
:REM 9 SPACES
705 FOR A=1 TO 7
710 PRINT"
            ";:REM 40 SPACES
715 NEXT A
720 PRINT"
          ";:REM 38 SPACES
725 POKE56294,6:POKE2022,224
730 POKE56295,6:POKE2023,224
735 POKE53281,0
740 PRINT CHR$(19):PRINT CHR$(5)
800 REM************************************
805 REM***    DO MATH PROBLEMS       ***
810 PRINT LINE$(07)SPC(10)"#"
815 PRINT LINE$(08)SPC(10)PROB
820 PRINT LINE$(09)SPC(20)N1$
825 PRINT LINE$(11)SPC(20)N2$
830 IF AN$="+" THEN PRINT LINE$(11)SPC(
18)"+"
835 IF AN$="-" THEN PRINT LINE$(11)SPC(
18)"-"
840 PRINT LINE$(12)SPC(18);
845 FOR A=1TO6: PRINT CHR$(100);: NEXT
850 PRINT LINE$(13)SPC(22);
855 GOSUB 2000:REM GET FIRST DIGIT
860 ANS = VAL(A$)
865 IF N3<10 THEN 900
870 GOSUB 2000:REM GET SECOND DIGIT
875 ANS = ANS + ( VAL(A$) * 10)
880 IF N3<100 THEN 900
885 GOSUB 2000:REM GET THIRD DIGIT
890 ANS = ANS + ( VAL(A$) * 100)
900 IF N3=ANS THEN 935
905 TRY=TRY+1:IF TRY=2 THEN 920
910 PRINT LINE$(15)SPC(12)"WRONG - TRY
AGAIN"
915 FOR A=1TO2000:NEXT:GOTO 600
920 PRINT LINE$(14)SPC(10)"WRONG."
925 PRINT LINE$(16)SPC(10)"THE ANSWER W
AS "STR$(N3)
930 GOTO 945
935 TL=TL+1
940 PRINT LINE$(15)SPC(15)"VERY GOOD!"
945 FOR A=1TO3000:NEXT
950 PROB=PROB+1:IF PROB < 6 THEN 515
```

To be continued on page 26

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Continued from page 25

```
955 POKE53280,14:POKE53281,2
960 POKE646,1:PRINT CHR$(147)
965 PRINT LINE$(10)SPC(10)"YOU GOT "TL"
 RIGHT!"
970 PRINT LINE$(12)SPC(8)"NOW IT IS TIM
E TO DRAW."
975 PRINT LINE$(15)SPC(8)"USE JOYSTICK
IN CONTROL"
980 PRINT LINE$(17)SPC(8)"PORT # 2"
985 FOR A = 1 TO 4000: NEXT
990 GOTO 3000
1000 REM*********************************
1005 REM***  BUILD RANDOM NUMBERS   ***
1010 N1=INT( (RND(0)*99) + 1)
1015 N2=INT( (RND(0)*49) + 1)
1020 IF N1 = N2 THEN 1015
1025 IF N1 < N2 THEN N3=N1: N1=N2: N2=N
3
1030 IF AN$="+" THEN N3 = N1 + N2
1035 IF AN$="-" THEN N3 = N1 - N2
1040 N1$ = STR$(N1):IF N1<10 THEN N1$ =
 " " + N1$
1045 N2$ = STR$(N2):IF N2<10 THEN N2$ =
 " " + N2$
1050 RETURN
2000 REM*********************************
2005 REM*** GET 1 DIGIT FROM ANSWER ***
2010 POKE204,0:POKE198,0
2015 PRINT"?"CHR$(157);
2020 GET A$: IF A$="" THEN 2020
2025 IF A$ < "0" OR A$ > "9" THEN 2020
2030 POKE204,1
2035 PRINT A$;CHR$(157);CHR$(157);
2040 RETURN
3000 REM*********************************
3005 REM***    DRAWING ROUTINE       ***
3010 PRINT CHR$(144);CHR$(147)
3015 POKE53280,8:POKE53281,15
3020 IF ZZ THEN ZZ=0: GOTO 3030
3025 SYS(49167):REM ... RESTORE SCREEN
3030 PRINT LINE$(25)SPC(10)"TIME LEFT =
   MIN.";
3035 PRINT CHR$(157)CHR$(157)CHR$(157)C
HR$(157);
3040 TIME$ = "000000"
3045 T2$ = MID$( TIME$, 4, 1)
3050 T2 = TL - VAL(T2$)
3055 PRINT CHR$(157)CHR$(157)CHR$(157);
T2;
3060 IF T2=0 THEN 3170
3100 JV=PEEK(56320):KV=PEEK(197):SV=PEE
K(653)
3105 FB=16-(JV AND 16):JV=15-(JV AND 15
)
3110 CH=PEEK(SC):CC=PEEK(SC+CO)
```

```
3115 IF CH>127 THEN POKE SC,171:GOTO312
5
3120 POKE SC,43:POKE SC+CO,CL
3125 FOR A=1 TO 100: NEXT
3130 POKE SC,CH: POKE SC+CO,CC
3135 FOR A=1 TO 80: NEXT
3140 IF FB THEN POKE SC,160:POKE SC+CO,
CL
3145 IF SV THEN POKE SC,32
3150 IF KEY(KV) THEN CL = KEY(KV)-1
3155 SC = SC + XY(JV)
3160 IF (SC < 1024) OR (SC > 1983) THEN
 SC = SC - XY(JV)
3165 GOTO 3045
3170 SYS(49152):REM ... SAVE SCREEN
3175 GOTO 400
3180 REM************ END ***************

READY.
```


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Computer Installation Tips

by Joe Rotello, Jr.

Introduction

Of all the areas of planning for a computer we see, the one that is most overlooked is the consideration given to the computer operating environment.

Things like furniture, flooring, power supply and telephone lines are often remembered last, or, sometimes, forgotten entirely. Keep some of the following ideas in mind when it comes time to install that new computer or change an existing installation around.

Whether you are a personal, business or corporate microcomputer user, the same basic ideas presented here apply to just about any level of user.

Where Is It Going To Go?

The very first step is to size up the room or area that the computer system is going to be located in. Is the area well lighted, but not too well lighted that glare off the CRT will become a problem?

Is the area cooled to the extent that the computer (and you) will not overheat or suffer from lack of sufficient ventilation?

Are there sufficient GROUNDED electrical outlets present around the room or at least in the area that will be specific to the computer work zone? One of the most irritating problems is to find that the electrical outlet system you are on is shared with many other electrical noise producing machines, such as air conditioners, heating and cooling devices and motor driven devices.

What happens when some of that "dirty" power gets into the computer system? Bad news, that's what. Lost data, periodic computer shutdowns and the like can be avoided if you take the time to survey the area, its power outlets, and the prospects for "clean power" BEFORE installing the computer system.

Try to put each piece of computer hardware on its own outlet, or better yet, install a multiple outlet with a master power switch. The bottom line here is to give each peripherial its OWN outlet. Don't cram or overload the outlet either.

Be sure to orient the cables and power cords of the computer system so that all safety hazards such as exposed connections, cords people could trip over or that a chair or table could pinch and the like are eliminated.

What Are We Going To Set It On?

Next, consider the tables or computer work stations you are going to use.

Is each table and video monitor platform at a proper and comfortable working height? Is the table area large enough for the terminal, video monitor, printer, disk drive and other accessories that you will be using?

If the printer will be placed on its own table, will the table be easy to reach when the time comes to connect cables and change or remove paper?

Be sure that the tables are sturdy. One of the most humorous (to the person who is looking on) sights is to see a hefty letter quality printer rocking a flimsy table each time the printer performs a carriage return. One finds oneself placing small wagers on when the whole installation will come grandly crashing to the floor.

So be sure to get firm, well assembled furniture. It does not have to be expensive, just well connected together and sturdy once assembled. DON'T EVER overload a table or desk REGARDLESS of how well it may seem to be constructed!

One last point. Always plan for EXPANSION. Someday (and a lot sooner than you think), you are going to add to the present system. Don't run out of room today for something that you will do tomorrow.

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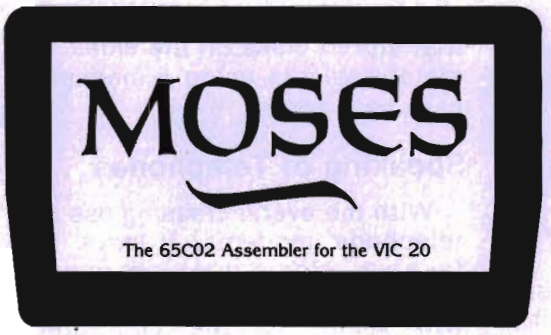

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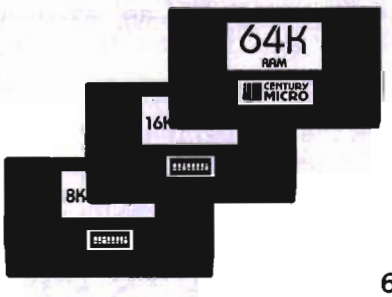

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What Type of Floor?

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The type of flooring that will be used in the area is very important to the life of your system (not to mention your sanity).

If carpeting must be used, try to select one of non-static material. Another method is to install a large area static mat over the carpet that will be centered under what one might call the "computer zone". The plastic static mat is grounded with a small slender wire and is perhaps the best safeguard against static.

An interesting option, and a good one if static will be a problem, is to locate one or more "static buttons" on the computer furniture. These "buttons" or "conductive foam" pads are grounded and act to drain off any static charge that you the operator may carry when they are touched.

Most importantly, when using static buttons, make it a habit to discharge yourself BEFORE touching a piece of equipment. Although it seems all shoes carry some type of charge, try to NOT wear hard rubber or hard smooth man-made sole shoes. They seem to be the worst as far as static is concerned. On the other hand, "Hush Puppy"™ or other similar sole type shoes seem to be the most compatible around computers.

Where Do We Store Things?

Next, take a good look at how you will store the day to day files, printouts and new or active file floppy disks. A clean, dust proof environment is essential not only to the proper operation of the computer equipment, but to the safety of your critical paper and magnetic disk media as well.

Disks should be able to stand up on shelves or in drawers. Paper should be stacked vertically when possible so as to not curl or bend. Remember that both floppy disks and paper prefer a low humidity moderate temperature environment.

Ribbons and other accessories should be available without having to tear apart a stocking area just to find them.

Keep ALL magnetic media away from any magnetic field. That means do not store any disk or tape near loudspeakers, motors, electric typewriters, fans or other office or home equipment that generates magnetic fields when in use.

Most importantly, the telephone is a remarkable magnetic field generator! Do NOT stack or store disks near, under or directly above a telephone! When the phone rings, there goes some data.

Reminds us of the sad story we heard of the well known company that stored disks on the sides of metal cabinets using a magnetically held box.....

Speaking of Telephones...

With the ever increasing use of telephone modems, it pays to take a close look at your telephone and how it relates or will relate to the computer system.

Locate the telephone in a convenient spot. Not too close to the computer system (see above!) but within easy access.

When using a modem, be sure that you try to have a private, non-extension phone line. Nothing disrupts a computer/modem system more than having a person picking up an extension phone and thereby terminating data transmission.

If you are in business, be sure that the modem telephone line is NOT part of your switchboard or PBX type system or your computer modem transmission will suffer the same fate as that of an extension phone.

Last but not least, make sure that the modem and telephone connectors are compatible and that your local telephone company is aware that a modem will be in use. In many locales, since the telephone company central switching is done through computers, the phone company may have to "condition" the central unit to accept your modem data properly.

Last Will and Testament

The most important item is just about the most distant in our minds. Always have full records of model, serial #, date of purchase and replacement cost available for each and every piece of computer hardware, software and accessories you own in case the unforeseen disaster occurs. Make MANY copies of this data, keep it up-to-date and store a copy at the computer site, your home and perhaps at your bank.

DO NOT store this data in a computer file! That is a dangerous mistake that we may make, thinking that if the computer is going to be used for data storage, why not....., well, you get the picture!

In conclusion, installing a micro-computer system, be it personal, small business or big corporation, may take more work and thought than originally anticipated.

In the long run, you will be glad you took that extra hour or spent that extra dollar! □

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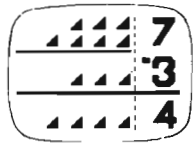

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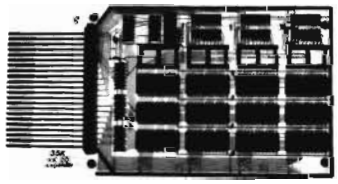

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ATTENTION ALL HAMS

COMMANDER Magazine

is proud to announce their monthly column **for Amateur Radio Enthusiasts!**

Command Post

by Jim Grubbs

The command post has always been the hub of communications. It is here that all information converges. Decisions are made based on all of the data that reaches the command post. Since the first leader organized the first government, communications has been one of the leading factors in success. The person who possesses the superior communication skills is victorious.

The modern command post is a myriad of communication forms. Each generation has contributed to communication as we know it today. But not since the moment when men and women first learned how to speak, and later created written language, has there been an advancement as far reaching as radio. Even in the crudest form, electro-magnetic propagation has been used for less than a century. Imagine the effect the Gettysburg address would have had on a populace listening world wide by radio!

Radio has evolved fairly rapidly as technology goes. From early spark gap transmissions on low frequencies to today's use of radio waves approaching the millimeter wavelength of light for satellite transmission, one identifiable group of individuals has been at the leading edge of virtually all new developments. The commercial operators called them "hams", the government called them amateur radio operators. But they existed even before the labels were applied.

To me an amateur radio operator is the perennial experimenter, always trying a new circuit or modifying an old one. In our time though, amateur radio has become many things. Amateurs are involved in worldwide voice, morse code, radio teletype, slow scan television, regular TV, facsimile, satellite communications, and such esoteric modes as moonbounce and meteor scatter propagation.

The eighties have finally brought the power of digital computers to within the easy reach of most of us. In the fifties, ILLIAC at the University of Illinois, a very early forerunner of HAL, kept many technicians busy every day replacing vacuum tubes. It was a massive machine, difficult to house even in a very large barn. Your VIC has more power than that whole machine. Your ten dollar calculator even has more power!

What happened in between ILLIAC and VIC was the space program. We gave ourselves a goal and then found the way to make the dream become reality. Scientists challenged old ways of doing things, formulating the answers to the problems ever increasing miniaturization presented. From all of this came the home computer. You may not realize it, but it was ready for you ten years ago. The captains of American industry though, realized you weren't ready for a computer yet. So they gave you PONG and then more sophisticated game machines. They designed plug in cartridges that looked like an eight track tape because you understood eight track tapes. All the while, you were being readied for a home computer.

There were many pioneers along the road, among them the Heath Company who pioneered some of the first analog and digital computers for the experimenter. I still fondly remember the Edmund Scientific analog computer my junior high math teacher bought and I assembled.

As the market increased more companies jumped on the band

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wagon, some with very good products, but still motivated by greed, with prices set as high as the market would bear.

Then something happened. At a Commodore board meeting, the founder of the company announced that Commodore was going to build a full color computer for $300! The skeptics were many. Little did they know that it was possible and before long they would be displaying proudly on their "golden arches" the over one million sold sign. The biggest surprise is perhaps that even with the VIC-20 in the $80 range and the C-64 at about $200, there is still room for a reasonable profit.

There are about 400,000 amateurs in the United States alone. Guess where a good many of those Commodore products have turned up. Since the beginning of 1983, amateur operators have been able to purchase a full fledged computer for less than most any other piece of equipment in the station. Even microphones and special morse code keys cost more than a VIC-20.

Amateur radio knows no age limits. The youngest is perhaps six, the oldest, who knows. The same is true of amateurs with computers. Most of you are aware of the possibilities of your Commodore computer, few of you yet know how to realize that potential. That is why Command Post was created, to help realize the possibilities. Every form of communications mentioned earlier can be enhanced or in some cases even revolutionized with the help of your computer. We will discuss ideas and concepts, look at commercially available amateur software and compatible hardware. We will concentrate on connecting your computer to the real world—your amateur station, and programs that assist in radio related activities that require no interfacing.

I'd like to speak to the non-amateurs for a moment. I'm glad you are still reading! Perhaps the subjects we discuss will prompt an interest in amateur radio or rekindle an old desire to be a "ham". The licensing structure is changing. In Canada "packet radio" already allows some computer hobbyists to exchange programs over the air eliminating telephone costs and tying up the family line. Perhaps you are already a short-wave listener. Many of the subjects we discuss here will allow you to listen in on teletype and code transmissions using your home computer, hooked up to your receiver. Even this month's project falls into this category. For the rest of you, all of the interfacing we discuss has applications for virtually any kind of control. If you do not already own one, a programmers reference guide is suggested. The memory map and explanations are particularly valuable. We will be looking at the pseudo RS-232 port quite a bit also.

For those of you who are interested, I have been a licensed amateur radio operator for 22 years. I was first licensed as KN9EIV at age eleven. My interest in computers began about the same time. My home built digital computer that added and subtracted from zero to 127 in binary won me top honors for my division in the St. Louis Science fair in 1963. The VIC-20 is my first real home computer. I have done a lot of design and building of digital control circuitry for amateur applications.

So, with any luck at all, one of our fellow amateurs Owen Garriott, W5LFL is in space aboard the space shuttle STS-9/Spacelab flight as this column appears. It somehow seems appropriate for the program that brought us our home computers to have a pioneer like Owen, an amateur radio operator, aboard. In celebration of these events, let's get on with the show!

In looking for a subject for my first column, I asked myself which program do I hear asked about the most. Without a doubt I get more inquiries about a CW (morse code) receive program than any other. It seems almost a ritual that when a ham buys a new computer one of the first things he or she does is write a simple morse code sending program. We will cover that subject in future issues and show you how to add some very nice features to a basic keyboard. For now though let's concentrate on something more fascinating, a CW receive program.

Before we proceed let me issue a few precautions. The receive program to follow has very definite limitations. Within these limitations it does work and is a good exercise in taking data and having our computer analyze it. It is a practical, simple program with practical applications, but it won't be everything we could hope for. After all, we have to save something for the future!

Our program was written for the VIC-20. It should be easily adaptable to the C-64 and other machines. You will have to bear with me for a few columns. I do not yet have access to a C-64, but hope to before year's end.

Machine sent morse code has several elements that make it a likely candidate for computer decoding. All the information in a morse code character is binary in nature. The key is either open or closed. Things get a bit more complicated when we realize that our on and off tones can be of two different lengths, one length for "dits" and another three times as long for "dahs". Additionally we have intra-letter spacing, inter-letter spacing and word spacing. We must be able to tell when each character begins and ends and when each word begins and ends. Our program must make allowances if we want it to decode more than one sending speed.

Within the limitations of the BASIC language and the speed of the VIC-20 the Command Post RX program meets these requirements.

Take a few minutes to type in the program as listed and then save it (See Figure 1). Steal your joystick (with firebutton) back from the kids. We are going to use it to send code to the VIC!

When a mathematical formula or set of formulas is used to represent a real world situation it is called an algorithm ('al ge rith em), our buzzword for the month!

Briefly, the program is broken

down into several parts. Lines 100 through 260 are initialization. Lines 280 through 480 are the meat of the program. The lines 500 and above are the data for our look up table, RX$.

We first determine if the key is up or down. Then we start timing the pulse if the key is down. When we let up on the key we do some more timing to decide whether the letter is finished. When you first run Command Post RX it really doesn't know the difference between dits and dahs, you have to teach it. It is a quick learner though! With the joystick plugged in use the fire button to send T E S T in morse code. Chances are you will get some gooble-di-gook on the screen. Now wait just a few seconds and try it again. If you are sending cleanly (not the easiest task with a joystick), by magic your VIC-20 prints T E S T as you send the letters!

Take a look at lines 310, 350, 390, and 430. We are actually checking the joystick FB pin to see if the button is pushed. We will discuss this more next time when we take a look at the I/O ports and how to get information into and out of them. The rest of our algorithm helps us determine dits and dahs and ultimately what character was received. That big long string in line 320 is our timing. It also continually adjusts for speed variations.

Now let's look at the data table for a minute. Notice anything about the arrangement of the letters and figures in our table? Sound out the letters or write down their morse equivalents. An "e" is a single dit. It holds position one in our table. How about the zero-dah,dah,dah,dah,dah. It is near the end of the table. Our final character is the period at position 83; notice it has six elements, the zero had five, the "e" only one. Look at the whole table and you begin to see the pattern. The shorter characters are first, the longer ones later. Can you spot the one confusing thing about this? How about "a" and "n", "d" and "u", etc. I'll let you think about those until next month.

The "-" is a fill character used in the table for illegal combinations of dits and dahs.

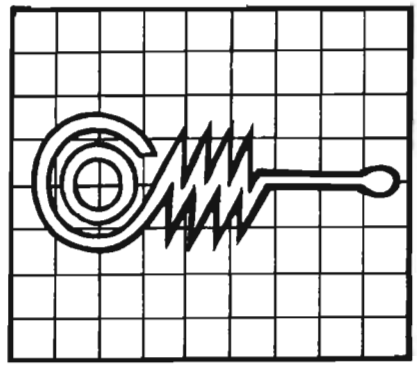
The program has two major limitations. Command Post RX has no way to adjust for sloppy sending. Unlike the human ear/brain combination, it can't guess what you send. It does everything in a very objective manner and prints exactly what you send. You can achieve some fine-tuning by playing with the value in lines 330 and 410-.60*Z. Try changing the .60 a bit one way or the other.

The other major limitation is speed. With the execution time necessary for BASIC this program can only get through its loops accurately to about twenty words per minute. The obvious solution is a machine language routine. Who will be the first to write us one?

The more experienced among you have probably already figured out how you can interface this to your receiver. For the rest of you, all the details come next month. In the meantime find yourself a 567 PLL integrated circuit chip and either a plug for the joystick socket or a connector for the user I/O port. Command Post RX is as good as all of the inexpensive software programs on the market right now, and all it cost you was the price of this magazine.

Finally, if you have any comments, suggestions, or general questions you can reach me at P.O. Box 3042, Springfield, Illinois 62708. If you expect a reply include an SASE and allow time for me to answer. In the meantime, welcome again to Command Post. Tell your friends! □

To be continued on page 38



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Line Feed, ASCII Conversion and Listing Legibility.

Line Feed: The CPI can generate a line feed if needed through software or hardware switches.

ASCII Conversion: The CPI converts Commodore ASCII into standard ASCII characters through software or hardware switches.

Listing Legibility: Since many printers do not support the codes/graphics that the VIC-20 and Commodore 64 produce, program listing can become illegible if not impossible (Printer may "hang-up"). The CPI provides three listing modes to address this problem — Normal, Extended Tag and Abbreviated Tag.

In the Normal mode the CPI passes all commands from the computer to the printer. The Normal code would be used for programs written by the user or programs with commands supported by the printer.

In the Extended Tag mode the CPI will generate "tags" (neumonics) for graphics, cursor control, print control and special characters. For any graphics characters that are not standard ASCII, the decimal value of the graphics symbol is printed. For instance, the "checker board" character (press the Commodore key and the plus sign) lists as [166].

The Abbreviated Tag mode is the same as Extended Tag mode, except all the tags are replaced by the "#" sign. This mode would be used if you wanted a program listing to be formatted as the original program. That is without the "tags" using several print spaces instead of one print space.

The CPI is equipped with a built-in self-test program that will check the RAM, ROM and I/O hardware of its microprocessor. This test can be helpful in determining if something is faulty or if the configuration you are using is valid. The self-test will print information to the printer.

CPI LISTING LEGIBILITY TAGS

TAG	Is Printed For:	TAG	Is Printed For:	TAG	Is Printed For:	TAG	Is Printed For:
[CD]	Cursor Down	[DL]	Delete	[ORA]	Change to Orange	[F2]	Function Key 2
[CU]	Cursor Up	[BLK]	Change to Black	[BRN]	Change to Brown	[F3]	Function Key 3
[CL]	Cursor Left	[WHT]	Change to White	[LTR]	Change to Light Red	[F4]	Function Key 4
[CR]	Cursor Right	[RED]	Change to Red	[GY1]	Change to Grey 1	[F5]	Function Key 5
[HC]	Home Cursor	[CYN]	Change to Cyan	[GY2]	Change to Grey 2	[F6]	Function Key 6
[CS]	Clear Screen	[PUR]	Change to Purple	[LTG]	Change to Light Green	[F7]	Function Key 7
[RV]	Reverse On	[GRN]	Change to Green	[LTB]	Change to Light Blue	[F8]	Function Key 8
[RO]	Reverse Off	[BLU]	Change to Blue	[GY3]	Change to Gray 3	[PI]	Pi Symbol
[IN]	Insert	[YEL]	Change to Yellow	[F1]	Function Key 1		

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Continued from page 35

LISTING 1

```
100 DIM RX$(85)
200 JS=37137:X=0:Y=0:Z=0
210 FOR N=1TO84:READ RX$(N):NEXT
240 POKE 37138,96
250 PRINT "[CLEAR][REV]COMMAND POST RX:
":PRINT
260 POKE JS,0
280 JR=PEEK (JS) AND 32:IF JR<32 THEN38
0
290 GOTO 280
300 S=0
310 JR=PEEK (JS) AND 32:S=S+10
320 IF JR=32 THEN Z=((5*Z)+(2*S))/6:Y=(
2*Y)+1:X=(2*X):GOTO 380
330 IF S <.60*Z THEN 310
340 Y=(2*Y):X=(2*X)+1
350 JR=PEEK (JS) AND 32:S=S+10
360 IF JR<32 THEN 350
370 Z=(4*Z+S)/5
380 S=0
390 JR=PEEK (JS) AND 32:S=S+10
400 IF JR<32 THEN 300
410 IF S<.60*Z THEN 390
420 GOSUB 470
430 JR=PEEK (JS) AND 32:S=S+10
440 IF JR<32 THEN 300
450 IF S<(2*Z) THEN 430
460 PRINT" ";:GOTO 280
470 X=(2*X):P=X+Y:IF P>84 THEN P=84
480 PRINT RX$(P);:X=0:Y=0:RETURN
500 DATA E,T,I,A,N,M,S,U,R,W,D,K,G,O,H,
V,F,-
505 DATA L,-,P,J,B,X,C,Y,Z,Q,-,-,5,4,-,
3,-,-,-,2,-,-,-
510 DATA -,-,-,-,1,6,-,/,-,-,-,-,-,7,-,
-,-,8
515 DATA -,9,0,-,-,-,-,-,-,-,-,-,-,-,-,
?,-,-,-,-,-,-,-
520 DATA -,.,-

READY.
```


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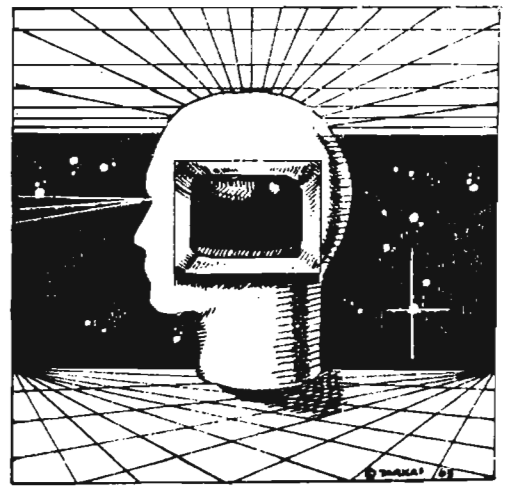
A Comprehensive Editor/Assembler for the VIC-20 and C-64

Part III

by Eric Giguere



This is the third and final part of my series on EDIT/ASM, a comprehensive editor/assembler for the VIC-20 and Commodore 64. It's of interest mainly to cassette users but I would also like the disk users to pay attention for the first few paragraphs as I have some changes to make.

Changes

These changes are concerned with the Assembler module given last month. I noticed two problems that need to be corrected. The first was when the program was getting the addressing modes it considered a label like LABEL+1 to be totally separate from LABEL, not just LABEL with one added. This created problems by giving error messages. The second problem also arose during the same section. The routine that figures out the addressing mode (lines 3175-3195) never bothered to check if there was a comma preceding an X or Y denotation. This meant that a statement such as STA LABELX would be interpreted as STA LABEL,X, the wrong addressing mode. To correct these problems I've included a list of changes to make at the end of this article (see Figure 1). Simply type in the lines exactly as listed (they'll write over some existing lines) and the problems will disappear. Save your new version and then have fun assembling your programs.

Assembling with Cassette

If you use a cassette recorder you're probably wondering why the Assembler module can assemble to disk but not to tape. The problem lies with the way cassette and disk files operate. With a disk drive you can open what is called a **program file**. This is a file that will be considered a program and will be loaded as such. All you have to do is open it, send two bytes holding the start address of the program and then send the rest of your program, one byte at a time. This is what the assembler does. Unfortunately, you cannot do this on a cassette recorder. The only type of files it will open are **data or sequential files**. Here, too, you can send data to the file one byte at a time, but you can't load the file when finished. It can only be accessed by an OPEN command, not a LOAD command. Because opening a file to cassette was not the solution, I had to find another answer to the problem.

At first I considered moving the OPEN routine in ROM down into RAM and make a few changes to it. But I felt that there were two problems with this: it would use up too much memory and it would be tricky to make the modifications. That is why I came up with the two programs CASS CONV 20 (See Figure 2) and CASS CONV 64 (see Figure 3). The will load in your data file from tape and then save the data as a program which can be loaded as usual. It's sort of a hassle, but it does work.

How to Use CASS CONV

Before you can use CASS CONV 20/64 it is necessary to add a few lines to the Assembler module. These are given at the end of the article and simply open a file to cassette and send a few parameters. From then on the assembled program will be sent in byte form using the CHR$ statement. When finished you'll have a data file that only needs to be converted into a program. REMEMBER: after the assembly you'll have only a data file, not a program. It will be necessary to use CASS CONV to change it to a program.

Once you have made the changes and saved the Assembler you can proceed to typing in CASS CONV. (CASS CONV 20 is for the VIC and CASS CONV 64 is for the C64.) Please make sure you have the appropriate version, as they are not interchangeable. After typing it in be sure to save the program, because a mistake in the data statements could cause the computer to lock up. Once you're sure everything is AOK you can run the program. Be sure to have a data tape prepared by the Assembler on hand. If you don't, use the Editor to create a simple little program and run it through the Assembler (which we just changed a while back). Reload CASS CONV and place the data tape in the recorder.

Now type RUN and hit RETURN. The screen will clear and there will be a momentary wait. Then the MESSAGE "ENTER FILE NAME:" ("FILE NAME:" on the VIC) will appear. Enter the name of the file you are going to convert. It will automatically add the suffix ".OBJ" (example: type in TEST and it will open TEST.OBJ). If you want to exit simply type QUIT when asked for the file name. It will then open the file and jump to a machine language routine which will load in your data, ask you to press a key and then save the data as a program. When it asks to press a key, rewind the tape or place a new one in the recorder. The program will then be saved under the same name. Once finished the computer may or may not return to the normal "READY.", depending on where your program was located (as defined by the ORG statement). If it doesn't, simply power down and up again (turn it off and on). You may now load your assembly language program.

A note of caution: if you accidentally stop the program never type CONT to continue where you left off. Instead, always RUN it over. Also, always use CASS CONV on a VIC with 12K or more (8K expander or greater), never on a regular VIC.

Moving the Cassette Buffer

CASS CONV works fine with almost any assembly language program. The only exceptions to this are programs residing in the cassette buffer. These cannot properly be converted by CASS CONV because it already uses the cassette buffer when loading in the data. Solution: moving the cassette buffer. This is achieved by typing

POKE 178,0: POKE 179,30 (RTN)

This moves the cassette buffer to 7680 instead of the normal 828, leaving you free to convert programs that normally reside there. After the conversion you should change it back:

POKE 178,60: POKE 179,3 (RTN)

The buffer will now be in its normal location of 828. Notice that you should do this kind of thing only with small programs. If you moved the cassette buffer while using a large program (such as the Assembler) you could effectively create a hole in the middle of the program. Always be careful when moving things around.

How CASS CONV Works

CASS CONV uses a machine language routine to load and save the data. This routine is poked into the first few lines of screen memory (starting at 4096 on the VIC and 1024 on the C64). I chose this location because you may want to assemble a program in a certain location and CASS CONV might already be there. To avoid this I placed the routine in screen memory where no one will touch it. This also explains why you should never type CONT if you stop the program. If you're not careful the whole routine will scroll off the screen and when you try accessing it the computer will freeze up. Be careful.

Figure 1

```
ADD THE FOLLOWING LINES TO THE ASSEMBLER MODULE:
3185 IFX$="X"ANDMID$(C$,LEN(C$)-1,1)=","THENXX=1:GOTO3205
3190 IFX$="Y"ANDMID$(C$,LEN(C$)-1,1)=","THENY=2:GOTO3205
3220 V$=C$:GOSUB5000:C$=V$
3222 IFLEFT$(B$,1)="B"ANDB$<>"BIT"THENT=9:GOTO3235
3225 F=0:FORI=1TOSY:IFC$=S$(I)THENIFV(I)+AD<256THENGR=0:F=1:I=SY+1
3226 NEXT:IFFTHEN3230
3227 GR=4
3230 T=GR+XX+Y+P+IM+1:IF(T=6ORT=7)AND(P=0)THENT=T+1
3233 IFT=3ANDP=0THENT=T-1
3235 PC=PC+1:IFT<4ORT=9THENPC=PC-1
3240 B%(G)=T:NEXTG
3555 NEXTG:PRINT#3,CHR$(0);:PRINT#4,R$"ASSEMBLY COMPLETE.":
IFSY=0THEN350
5010 Z$=RIGHT$(V$,1):IFZ$=","ORZ$=")"THENV$=LEFT$(V$,F):GOTO5005
5011 IFZ$<>"X"ANDZ$<>"Y"THEN5015
5012 IFMID$(V$,F,1)=","THENV$=LEFT$(V$,F):GOTO5005
READY.
MAKE THE FOLLOWING ADDITIONS FOR CASSETTE:
2680 OPEN3,1,2,OF$:GOTO2710
2715 DV=OG-INT(OG/256)*256:PRINT#3,CHR$(DV);CHR$(OG/256);
3245 IFOD=1THENDV=PC-INT(PC/256)*256:PRINT#3,CHR$(DV);CHR$(PC/256);
READY.
```

To be continued on page 42

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As I was saying, CASS CONV uses a machine language routine. I've provided the assembly listing (done on EDIT/ASM, of course) for all you assembly language fanatics (see Figure 4). Basically what it does is load in the start address and set a pointer to this location. (The $FFFF at line 34 is just there as a dummy location. It is changed by lines 24 and 27.) It also loads the ending address and places this in memory. The computer then loads each byte of the program and stores it in memory, incrementing the pointer each time. When it reaches the location pointed to by LENGTH it stops and loads the end-of-program pointer with this value. It closes the file, prints a message and saves the data as a program. It's a simple routine that does the job quite well.

You probably noticed that I didn't have to use the pointer LENGTH in my program. Instead, I could have used ENDPRG, which would also save me the trouble of loading it in lines 45 to 48. The only reason I put it in was to make the program a bit clearer. I think it is easier to follow with LENGTH and ENDPRG as separate pointers. (If you want, you could always use EDIT/ASM to change it!)

A Final Word

I have to admit that EDIT/ASM is a trifle slow when assembling. This is to be expected: the program is in BASIC. But it beats paying $50-$150 for an assembler. That's why I think EDIT/ASM is quite worth typing in. But for those cassette users who don't want to enter all three programs simply send me a self-addressed (no stamps unless Canadian) mailer and a blank cassette along with $6 to: Eric Giguere, Box 901, Peace River, Alberta, Canada T0H 2X0. Please be sure to include which version you want, otherwise I'll send you the VIC version. If you have any questions or problems please do not hesitate to write me at the above address. Have fun!□

Continued from page 40

Figure 2

```
5 PRINT"[CLEAR]":FORI=0TO132:READA:POKE
4096+I,A:NEXT
10 POKE36879,27
20 PRINT"[BLACK][DOWN][DOWN][DOWN][DOWN
][DOWN][DOWN][RIGHT][RIGHT][RIGHT]EDIT/
ASM CASSETTE[RIGHT][RIGHT][RIGHT][RIGHT
][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT]CON
VERTER"
30 PRINT"[DOWN][BLUE]FILE NAME: ";:OPEN
1,0:INPUT#1,NA$:PRINT:CLOSE1
35 IFNA$="QUIT"THENEND
40 NA$=NA$+".OBJ":PRINT"HIT RETURN WHEN
 READY":WAIT197,64:WAIT197,13
45 PRINT"OK."
50 OPEN1,1,0,NA$:PRINT"LOADING....":SYS
4096
60 END
100 DATA 32, 192, 255, 162, 1, 32, 198,
 255, 32, 207, 255, 133, 193, 141
101 DATA 38, 16, 32, 207, 255, 133, 194
, 141, 39, 16, 32, 207, 255, 133
102 DATA 251, 32, 207, 255, 133, 252, 3
2, 207, 255, 141, 255, 255, 238, 38
103 DATA 16, 208, 3, 238, 39, 16, 173,
38, 16, 197, 251, 208, 235, 173
104 DATA 39, 16, 197, 252, 208, 228, 17
3, 38, 16, 133, 174, 173, 39, 16
105 DATA 133, 175, 169, 1, 32, 195, 255
, 162, 255, 232, 189, 109, 16, 240
106 DATA 5, 32, 66, 231, 208, 245, 165,
 197, 201, 64, 240, 250, 169, 193
107 DATA 166, 174, 164, 175, 32, 216, 2
55, 32, 204, 255, 96, 72, 73, 84
108 DATA 32, 65, 32, 75, 69, 89, 32, 84
, 79, 32, 83, 65, 86, 69
109 DATA 46, 46, 46, 46, 13, 0, 0
```

Figure 3

```
5 PRINT"[CLEAR]":FORI=0TO132:READA:POKE
1024+I,A:NEXT
10 POKE53280,3:POKE53281,1
20 PRINT"[BLACK][DOWN][DOWN][DOWN][DOWN
][DOWN][DOWN]EDIT/ASM CASSETTE CONVERTE
R[DOWN][DOWN]"
30 PRINT"ENTER NAME OF FILE: ";:OPEN1,0
:INPUT#1,NA$:PRINT:CLOSE1
35 IFNA$="QUIT"THENEND
40 NA$=NA$+".OBJ":PRINT"[DOWN]PRESS RET
URN WHEN READY..":WAIT197,64:WAIT197,13
45 PRINT"OK..."
50 OPEN1,1,0,NA$:PRINT"LOADING....":SYS
1024
60 END
100 DATA 32, 192, 255, 162, 1, 32, 198,
 255, 32, 207, 255, 133, 193, 141
101 DATA 38, 4, 32, 207, 255, 133, 194,
```

```
 141, 39, 4, 32, 207, 255, 133
102 DATA 251, 32, 207, 255, 133, 252, 3
2, 207, 255, 141, 255, 255, 238, 38
103 DATA 4, 208, 3, 238, 39, 4, 173, 38
, 4, 197, 251, 208, 235, 173
104 DATA 39, 4, 197, 252, 208, 228, 173
, 38, 4, 133, 174, 173, 39, 4
105 DATA 133, 175, 169, 1, 32, 195, 255
, 162, 255, 232, 189, 109, 4, 240
106 DATA 5, 32, 22, 231, 208, 245, 165,
 197, 201, 64, 240, 250, 169, 193
107 DATA 166, 174, 164, 175, 32, 216, 2
55, 32, 204, 255, 96, 72, 73, 84
108 DATA 32, 65, 32, 75, 69, 89, 32, 84
, 79, 32, 83, 65, 86, 69
109 DATA 46, 46, 46, 46, 13, 13, 0
```

Figure 4

```
0001 0400             ***********************************
0002 0400             * EDIT/ASM III - CASSETTE SAVER
0003 0400             ***********************************
0004 0400             ;
0005 0400                   ORG $0400     ;SCREEN MEMORY ($1000 FOR VIC)
0006 0400           ;
0007 0400           OPEN    EQU $FFC0     ;OPEN FILE
0008 0400           CHKIN   EQU $FFC6     ;SET INPUT CHANNEL
0009 0400           CHRIN   EQU $FFCF     ;GET CHARACTER FROM FILE
0010 0400           PRINT   EQU $E716     ;PRINT=$E742 FOR VIC
0011 0400           CLOSE   EQU $FFC3     ;CLOSE FILE
0012 0400           CLRCHN  EQU $FFCC     ;CLEAR I/O CHANNELS
0013 0400           SAVE    EQU $FFD8     ;SAVE MEMORY
0014 0400           STPROG  EQU $C1       ;START OF ASSEMBLY PROGRAM
0015 0400           ENDPRG  EQU $AE       ;END OF PROGRAM
0016 0400           KEY     EQU 197       ;KEYBOARD MATRIX
0017 0400           LENGTH  EQU $FB       ;COMPARISON POINTER
0018 0400           ;
0019 0400 20 C0 FF  START   JSR OPEN      ;MAKE SURE FILE IS OPEN
0020 0403 A2 01             LDX #1
0021 0405 20 C6 FF          JSR CHKIN     ;OPEN INPUT LINE TO FILE #1
0022 0408 20 CF FF          JSR CHRIN     ;GET LOW-BYTE OF START ADDRESS
0023 040B 85 C1             STA STPROG
0024 040D 8D 26 04          STA POINTR+1
0025 0410 20 CF FF          JSR CHRIN     ;GET HIGH-BYTE
0026 0413 85 C2             STA STPROG+1
0027 0415 8D 27 04          STA POINTR+2
0028 0418 20 CF FF          JSR CHRIN     ;NOW GET LOW-BYTE OF LENGTH
0029 041B 85 FB             STA LENGTH
0030 041D 20 CF FF          JSR CHRIN     ;GET HIGH-BYTE
0031 0420 85 FC             STA LENGTH+1
0032 0422           ;
0033 0422 20 CF FF  LOOP    JSR CHRIN     ;LOOP TO STORE VALUES IN MEMORY
0034 0425 8D FF FF  POINTR  STA $FFFF     ;AS POINTED TO BY POINTR
0035 0428 EE 26 04          INC POINTR+1  ;MOVE POINTR UP 1
0036 042B D0 03             BNE SKIP
0037 042D EE 27 04          INC POINTR+2
0038 0430 AD 26 04  SKIP    LDA POINTR+1  ;COMPARE POINTR TO SEE IF IT
```

To be continued on page 44

Continued from page 43

```
0039 0433 C5 FB          CMP LENGTH      ;HAS REACHED MEMORY
                                          POINTED TO BY
0040 0435 D0 EB          BNE LOOP        ;LENGTH
0041 0437 AD 27 04       LDA POINTR+2
0042 043A C5 FC          CMP LENGTH+1
0043 043C D0 E4          BNE LOOP        ;NO, GO BACK FOR MORE
                                          CHARACTERS
0044 043E                ;
0045 043E AD 26 04       LDA POINTR+1    ;ENDPRG IS POINTER TO WHERE
0046 0441 85 AE          STA ENDPRG      ;TO SAVE UP TO
0047 0443 AD 27 04       LDA POINTR+2
0048 0446 85 AF          STA ENDPRG+1
0049 0448                ;
0050 0448 A9 01          LDA #1
0051 044A 20 C3 FF       JSR CLOSE       ;CLOSE FILE #1
0052 044D                ;
0053 044D A2 FF          LDX #255        ;PRINT MESSAGE
0054 044F E8          GET INX
0055 0450 BD 6D 04       LDA MESSGE,X
0056 0453 F0 05          BEQ WAIT
0057 0455 20 16 E7       JSR PRINT
0058 0458 D0 F5          BNE GET
0059 045A                ;
0060 045A A5 C5       WAIT LDA KEY         ;WAIT FOR A KEYPRESS
0061 045C C9 40          CMP #64
0062 045E F0 FA          BEQ WAIT
0063 0460                ;
0064 0460 A9 C1       RESAVE LDA #STPROG   ;LOAD POINTERS
0065 0462 A6 AE          LDX ENDPRG
0066 0464 A4 AF          LDY ENDPRG+1
0067 0466 20 D8 FF       JSR SAVE        ;SAVE FROM STPROG TO ENDPRG
0068 0469                ;
0069 0469 20 CC FF       JSR CLRCHN      ;MAKE SURE EVERYTHING IS
0070 046C 60          EXIT RTS           ;NICE & TIDY AND LEAVE
0071 046D                ;
0072 046D 48 49 54    MESSGE ASC 'HIT A KEY TO SAVE....'
         20 41 20
         4B 45 59
         20 54 4F
         20 53 41
         56 45 2E
         2E 2E 2E

0073 046D                ;
0074 046D                ;TWO CARRIAGE RETURNS AND A ZERO DELIMITER
0075 046D 0D 0D 00          BYT 13,13,0
0076 0470                ;
0077 0470                ;VIC VERSION HAS ONE C.R. AND TWO ZEROS

SYMBOL TABLE:

OPEN---$FFC0  CHKIN--$FFC6  CHRIN--$FFCF  PRINT--$E716  CLOSE--$FFC3
CLRCHN-$FFCC  SAVE---$FFD8  STPROG-$C1  ENDPRG-$AE  KEY----$C5
LENGTH-$FB  START--$0400  LOOP---$0422  POINTR-$0425  SKIP---$0430
GET----$044F  WAIT---$045A  RESAVE-$0460  EXIT---$046C  MESSGE-$046D
```

The Basics of Basic Part II

Commands in Overview

by Tim Parker

In the last column of this series, I mentioned a few of the ways to make BASIC programming a painless undertaking. Such things as structuring programs, documenting well, and using descriptive variable names seem like common sense, but are seldom employed.

In this second part, as promised, we'll look at a few of the more advanced BASIC functions that are readily available to the Commodore computer user, and also delve into a few other assorted subjects. Once again, a reminder that this series is not going to teach you the fundamentals of BASIC. For that you require a well written book. Instead, this series will examine a few of the "tricks" that make BASIC programming easy, fast, and versatile from a programmer's point of view. (Those that missed the first installment, can order a back copy of Commander's June issue.)

First a word about the Commodore BASICs. On all Commodore machines I have seen, the ability to use full screen editing exists. That means that if an error is made in a line, the operator (programmer) merely has to move the cursor to the error and correct it on the screen. When the RETURN key is hit, the error will have been corrected. The ability to employ full screen editing is a virtue few programmers appreciate until they use a computer without the function. Many machines running a standard BASIC require either an exasperatingly complex editing sequence to be learned, or need the faulty line to be typed. When a program has many bugs, that can get to be very frustrating!

Another feature that is sported by most Commodores is the ability to abbreviate instructions. For example, the VICs allow a two key sequence to replace a typed word in most cases. This again speeds up programming. The most useful feature is using question marks in place of print statements. When these programs are LISTed, the computer usually replaces the abbreviation with the full word to ease reading and debugging.

The instructions in a BASIC version can be grouped according to function. Some control the machine and its workings in a physical sense, such as RUN/STOP, CLEAR, etc. These are command functions. Others are used to communicate with storage devices, screens, and other peripherals. These are INPUT/OUTPUT commands, usually abbreviated to I/O. There are built in mathematical functions, and string manipulation functions, and there are the BASIC instructions that are used to write the program. We'll examine the latter first.

Statements are the controlling aspects of any program. They direct the machine's actions. Although the number of statements, and their syntax may be different on certain machines, they all share a similar "core" series. Instructions such as IF/THEN and GOTO are required in all BASIC versions in order to work. A rapid look at the Commodore BASIC statements follows.

To clear a program from memory, we know to type NEW. NEW is not really a statement as defined above, but is a command function. The task of clearing all memory except for the program currently loaded is relegated to the CLEAR function (sometimes abbreviated as CLR). To understand what CLEAR does, it is first necessary to realize that BASIC will assign a memory location for each variable defined in a program. If ten variables are used,

there will be ten "slots" reserved in memory for the values of the variables. These are updated throughout the execution of the program to new values. (Incidentally, this is also involved in memory saving: since each new variable takes up memory, it makes sense to use as few different variables as required when memory is scarce. (More on that at a later time.) If a subscripted array was used (e.g. VA(10)) then the values of all ten VA variables will be used. CLEAR will erase the values of the variables from memory, allowing full use of all the available space. This may be required in programming from time to time when the values of all variables up to a certain point are no longer needed. If they were all set to zero with a LET statement, they would still occupy memory space, but the CLEAR gets rid of them entirely.

While on the subject of memory, it is useful to examine the DIM statement. DIM will dimension an array. An array is a number of variables with the same name, but different values according to an index. For example: A(1) is not the same variable as A(2) or A. Each is separate. So what good is the array? It allows fast access in loops, routines, and other repeated series to the variables without a lot of coding. For a full explanation, consult a good BASIC instruction book. The DIM statement will set the number of array elements required by the program. If the instruction DIM A(10) is used, then ten variables A(1) through A(10) are set up. The default value for an array is ten, if not otherwise declared by a DIM statement.

Probably the least understood BASIC instruction is the DEF FN sequence. DEF FN represents the command DEFine a FuNction. A function is a series of instructions that have to be executed. For example, if we wanted to add ten to a number, then divide by three to get the answer, and the sequence was to be repeated at several locations throughout the program, it would be tedious and memory wasting to type in the sequence wherever required. By defining the function "add ten, divide by three" and calling it some name, whenever the function is required, we can call it by name. This saves memory, time, and coding. Variables can be passed into the function, and extracted. It can be repeated as many times as required, and several functions can be accessed.

There are a few rules governing the DEF FN function in Commodore BASIC. Most versions allow only one letter to be used as the name of the function, such as FNZ, or FNC. Also, in almost all BASICs, the definition of the function has to be declared before it is used. Most programmers define all the required functions at the start of the program, instead of interspersed throughout. This aids in debugging, and makes it easy to locate functions as required.

The FOR/NEXT (STEP) function allows looping for a certain number of times to be achieved in a BASIC program. A variable is used as a counter in the loop, and is incremented when the NEXT instruction is encountered. The loop is terminated after the FOR conditional is satisfied. The STEP command allows control of the way the variable is counted. It can be incremented or decremented by any number of steps as required by the programmer. The STEP can be a function in some versions of BASIC.

While on the IF/THEN loop, it can be pointed out that some advanced versions of BASIC allow variations on the theme. Loops of the DO WHILE or REPEAT UNTIL conditionals can be encountered, but these are not usually included in home computer versions.

Some commands don't have to be written at all. BASIC has the LET command to assign a value to a variable, but almost all BASIC versions do not require the LET to be explicitly stated. Also, the END statement, which is in most BASICs, doesn't have to be included at the conclusion of most programs. When the program runs out of lines, it is ENDed, whether with the command END or not. END is only used in a program when an END is part of the way through the program, with code following it.

Mathematical routines are included in BASIC for the standard functions such as sine (SIN), cosine (COS), tangent (TAN), exponent (EXP), logarithm (LOG), absolute value (ABS), and others. Note that Commodore BASIC and most others compute trigonometric values (SIN, COS and TAN) in radians, which will require conversion to degrees or gradiants, as required. Also precision on the trigonometric functions varies widely depending on the version. Some hyperbolic and inverse trigonometric functions (ATN for arctangent, etc.) are usually supported.

The logarithm function (LOG) requires a value greater than zero in order to avoid an error. The LOG function computes the natural logarithm, usually referred to as 1n, instead of the base 10 logarithm. Similarly, the square root function (SQR) requires a value greater than zero to avoid an error.

Some character manipulation instructions are included in most BASICs, including the Commodore version. For a character string, the length of the string can be found using the LEN command. The left most series of characters can be accessed using LEFT$, while RIGHT$ will access the right most number of digits required. If a sequence is required out of the middle of the string, the MID$ command is used. With most of these, the starting position for the search, and the length of the string to be recovered, can be specified.

These commands allow great flexibility in program design using character string variables. A great deal of information can be stored in a string, and accessed chunk by chunk as required.

A couple of commands allow conversion from character string to number variable, and vice versa. These are VAL and STR$, and

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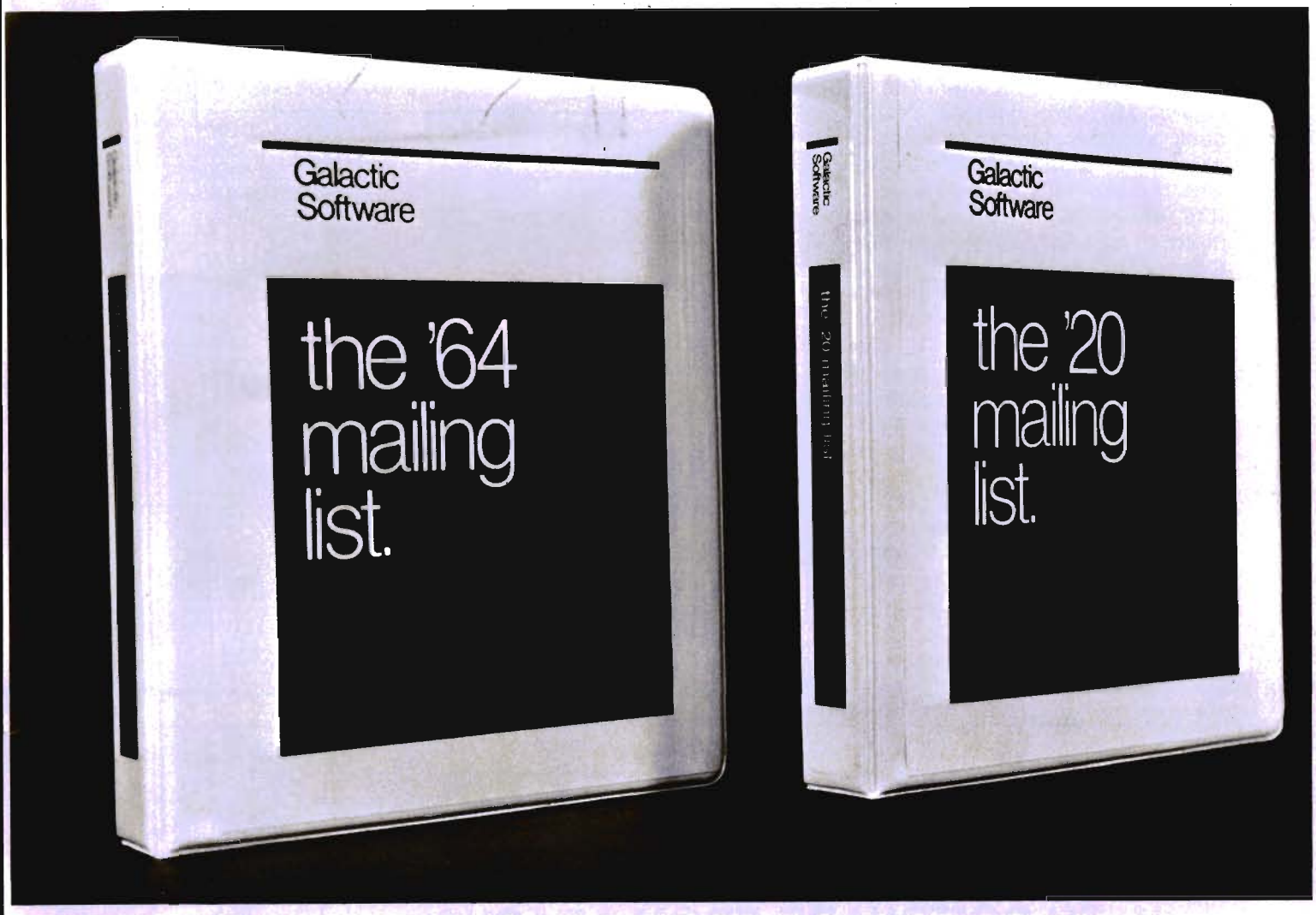

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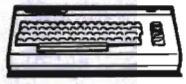
require careful use in order to get the information required.

PEEK and POKE are two very misunderstood and misused commands. They are used to place a value in a certain memory location, or to go and look at the value in a memory location. These values can control many things such as the color of the cursor, screen, etc. Instead of dealing with the two here, a future part in this series will deal with the memory locations of value in the Commodore computers.

In the next part of this series, we'll take a look at the last few things to be addressed in the understanding of BASIC, before actually dealing with specific Commodore computers and their idiosyncrasies. These include Boolean operators (always a fun subject) and their related truth tables, as well as several other miscellaneous bits of data.□



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Living with the VIC-20

by Colin F. Thompson

I love surprises. Recently I received a mystery cassette tape in the mail. No explanation of its contents was indicated, save for the name M. Pascall Software on the label. I popped it into my cobweb covered datasette and loaded it. The tape proved to be a masterstroke of advertising genius. It was a catalog! A program sampler would be a more accurate description. It took 30 minutes to completely review the tape. 21 VIC programs are previewed. Games and other home entertainment seem to make up the bulk of the product line, with some programming charts and dust covers added at the end. I liked the high resolution color graphics and sound. Novice programmers can find some good programming tips in the program listings. Although I haven't seen any of the complete programs, I highly recommend the catalog, which I discovered costs one dollar. It's certainly worth a buck. M. Pascall Software, Box 1143, Santee, CA 92017.

Super VIC-Kit

For a year I toyed with the idea of buying a Programmer's Aid. I think the name (PA) intimidated me. Since I rarely write programs, I really don't consider myself a programmer. Usually I modify commercial programs to match my hardware. I always thought a PA was useful only to professional programmers. Now I know better.

PA's are available from several companies, including Commodore, Skyles and UMI. Their primary function is to add some extra BASIC commands that the VIC doesn't have. All of the various PA's have some common commands. Renumber, Append, Delete and Decimal to Hex conversion are typical of these extra commands. Each PA, however, has its own unique commands, which means you should examine each user's manual before you buy. The price for each of the three PA's listed above is $60 and up.

They are all quality products, and I recommend them, but they now have some stiff competition from a PA with a $25 price tag.

But What Does It Mean?

It means more BASIC commands for your use. All VICs have commands like PRINT, GOTO and RND. Super VIC-Kit (SVK) adds 22 more commands and several useful features. Take a moment to read the new commands listed in Figure 1.

Experienced VIC users should notice two commands immediately: DLOAD and DSAVE. These are BASIC 4.0 disk commands, not normally useable on the BASIC 2.0 VIC. These commands illustrate as well as any, the power of SVK. This is how you usually load a program from the disk:

```
LOAD"PROGRAM NAME",8
```

SVK does it like this:

```
DLOAD"PROGRAM NAME
```

Notice the ",8 is missing. The syntax for DSAVE is the same. All disk commands are simplified. You don't have to OPEN 1,8,15 to send commands. SEND does it for you, and then CLOSE's the channel automatically.

One feature I like is the Space Bar/Pause option. When lines are scrolling on the screen from the LIST, DLIST, FIND, CATALOG and hex dump commands, you can pause the listing by pressing the space bar. Scrolling continues when it's hit again. SVK won't scroll backwards, though. All of the commands can be typed in the abbreviated style like the standard VIC commands. Type the first letter and shift the second letter.

Another useful feature is also a form of abbreviation. By entering "KEY", your keyboard comes alive. 24 alphabet keys are now pre-programmed function keys. Type a shifted C, for example, and the word CHR$ appears on the screen. Figure 2 lists the Automatic Keywords. This speeds up program writing and really helps when you are copying a program from a magazine into the computer. I suggest you label each key,

rather than looking up the proper key from a table. The keyword function is not active when you are keying inside quotes.

The British pound sign will let you escape from the dreaded "quotes mode" without frustration. RENUMBER will not only renumber your program line numbers but will renumber all the GOTO and GOSUB's as well. If a bad target line is found, it will be annotated for easy repair. A 16K program takes about 45 seconds to renumber. That is slow by some standards, but it seems fast enough for me.

Dessert

I've left my favorites for last. CATALOG will bring in the disk directory and scroll it onto the screen without disturbing the program in memory. You can't print the directory with the CATALOG command, but seeing it on the screen is usually sufficient. DLIST works just like CATALOG, except it lists a program on the disk while another program is in the memory.

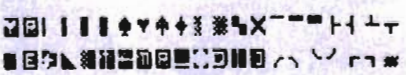
Machine Language, Anyone?

Super VIC-Kit has a built in machine language monitor, MACH-20, for the advanced user. It is activated by the BREAK command. A separate user's manual for the monitor comes with SVK. If you are not already proficient in machine coding, the monitor won't be of much use to you. On the other hand, it does allow me to keep up with Eric Giguere's excellent series "An Introduction to Assembly Language" found every month in **Commander**. The monitor supports L,S,M,R,X,G,; and : commands.

Now that I've used a Programmer's Aid, I would recommend it to anyone who uses BASIC. The new commands are not difficult to learn or use, and are especially useful for program writing and disk operations. The user's manual is short, clear and to the point.

Specifications

SVK is written entirely in machine language. It requires a minimum of 8K and when loaded will automatically relocate to the top of available memory. No zero page locations are altered. Although no warranty is stated in the manual, I found that the disk will be replaced to a registered owner at any time. Super VIC-Kit was written by Thomas Henry and is available on disk only for $25, from Mantronics Software Designs, 360 Pierce Avenue Suite 210, No. Mankato, MN 56001, (507) 345-7048. The C-64 version will be available in August.



The Connection— A Parallel Printer Interface

You **can** have your cake and eat it too. In this world of technological trade-offs, it's good to see a product that does it all, with no compromises.

While shopping for a printer for my VIC, I discovered that all dot matrix printers fall into one of two classes: slow printers with Commodore graphics and fast printers without Commodore graphics. Of course I wanted speed and graphics, but since I couldn't have both, I chose speed and bought an NEC 8023A. The performance and reliability of the NEC has never disappointed me. The lack of graphics has been a burr under my saddle for a year.

The NEC will print graphic symbols from its ROM, but the process is overly complex and beyond the abilities of novice programmers. One reason for the complexity is the user's manual. It is vague, incomplete, inaccurate, and was written by someone who does not have a good grasp of the English language. Given all that, you can see why I've been looking for a device that would emulate the VIC 1525 printer at 120 Characters Per Second.

Electronic Nirvana

The device responsible for this miracle is called The Connection. It will allow communication between the VIC/64 and any printer using the Centronics (parallel) interface. Letter quality printers will work with the device. The Connection plugs into the serial (disk) port on the VIC. It can be daisy-chained as the last device on the bus and can be assigned any valid device number. Device 4 is standard.

The Connection performs many other functions, besides graphics emulation. There are nine modes of operation, selected by a secondary address. For example, the "Emulate Cursor Up Mode" can be entered by typing OPEN4,4 or OPEN4,4,1. The ",1" is the secondary address. This mode will print upper case letters and graphics. VIC 1525 users will already be familiar with this concept. Figure 3 shows the secondary addresses required to use the different modes.

Secondary addresses 0, 2, 4 and 7 will automatically send a line feed following a carriage return. Addresses 0, 3, 5, 6 and 8 will not generate a line feed. The secondary address scheme is used by many other parallel interfaces, but this is the first one that will generate Commodore graphics. The reason for this is quite simple: The Connection is intelligent. It is "powered" by a 6502 microprocessor. The 6502 intercepts all data sent to the printer and acts on it according to the secondary address it received previously. The 6502 is aided in this task by a ROM chip which has been preprogrammed with all the instructions necessary to communicate with your printer. ROMs are available for a wide range of printers. My NEC uses the ROM programmed for the C. Itoh Prowriter.

The Emulate mode also allows you access to several functions unique to the VIC 1515/1525. Figure 4 lists these useful functions. Coupled with the graphics abilities, they allow me to key in and run programs written for the VIC printers. The Connection also has its own set of unique commands which are implemented from the Emulate mode. They let you reassign the device number, define the number of columns to

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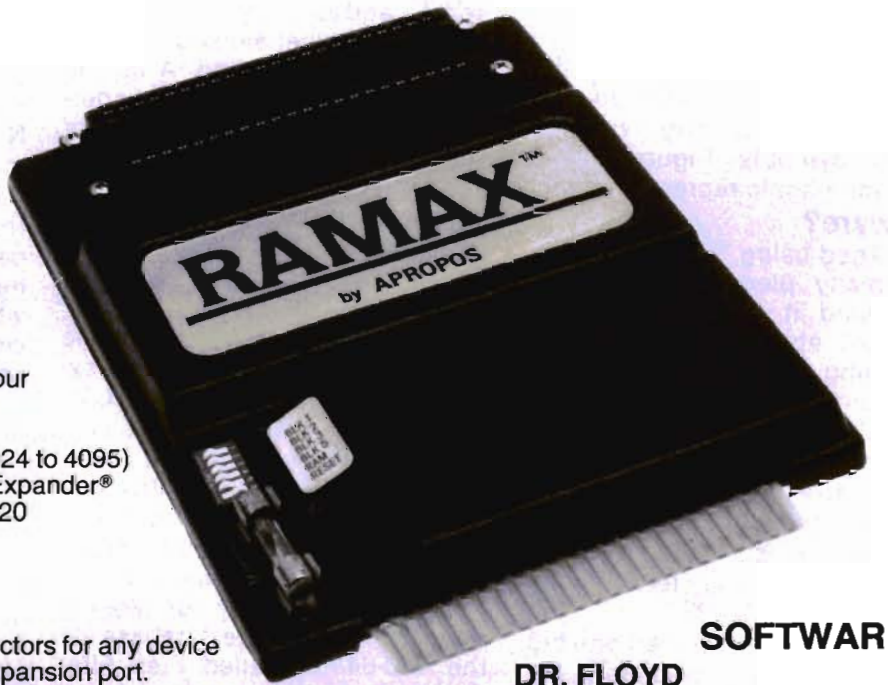

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APROPOS TECHNOLOGY

Circle No. 37

print, set a TAB and check printer status.

All of The Connection's commands may be sent from a BASIC program. Program listings look sharp and clear with the graphic characters printed by my NEC. Listings may be enhanced by using the "Total Text Mode" with secondary address 2 or 3. This will print keyboard control keys as an abbreviation between brackets like this: (CLR), (HOM), (RED), (DWN) and (166). The 166 is an example of a graphic symbol's CHR$ code. By using this mode for program listings, all the guesswork is taken out of your interpretation of the various graphic symbols. Figure 5 lists these mnemonic representations.

Software?

I've tried using The Connection with many pieces of software, and found it to be compatible with just about everything. The only thing that gave me trouble was Quick Brown Fox. To print a QBF file, I have to answer the question "Commodore?" with a "Y". Printer control codes sent from the body of the text must have two escape codes (#n027 #n027) before the letter command.

The Connection solved one big problem for me immediately. My NEC printer is one of those rare ones that require a line feed sent after a carriage return. This means I must open a logical file number greater than 127. Most commercial software uses LFN 4, requiring me to change the OPEN statement from OPEN4,4 to OPEN 128,4. Since The Connection already knows this, it automatically adds the line feed.

Two LED indicator lights reflect the status of the device, and a push button reset will clear the 1.3K buffer. The push button will also send a printer test to check the operation of the interface and the printer.

Is it worth the price? Definitely. Now I have a printer that lists and performs like the VIC printer, but with clarity, high speed, and some added formatting commands. The user's manual is well written and illustrated. A novice user would have no trouble understanding it. The Connection is available from Micro-Ware Distributing, P.O. Box 113, Pompton Plains, NJ 07444. $119.00 for the VIC and C-64.

In the Queue

In the coming months some very powerful software will be examined in these pages. TOTL Software is on the verge of releasing its long awaited TOTL.BUSINESS package for the VIC and C-64. I've been using it for a month and believe it will make a lot of small business owners very happy. Michael Riley has already released his ultimate database for the VIC-64-Pet called Flex File. I've had it under review for 6 weeks now and I'm convinced it's the most powerful database yet for the two smaller Commodores.

If you have a VIC and are considering "upgrading" to a C-64, let me give you something to think about. The two programs just mentioned and several more I use, including PractiCalc and Quick Brown Fox operate on the VIC and the 64 with no reduction in computing power for the VIC version. They are the same programs.

Double Vision

This fall, I'll be adding something new to the column. I will be reviewing the Data 20 Corporation's 40/80 column card with 64K of bank selected memory. To date I've found few programs are directly compatible with this device. What I mean is many programs will work but few take advantage of the extra screen size. No programs will use the paged memory. Data 20 has collected the names of several programs that are compatible with the device. I will print that list here next month. I will also report which software I've used that works or doesn't. Each month a small space in the column will be devoted to news on the 40/80 column front. In some applications I like to use 40 columns on my VIC. TOTL.LABEL is easier to use this way. Some new 40/80 column devices are on the market now, at affordable prices. Perhaps more software writers will take note of this expansion explosion and provide us with expandable software. Maybe—just maybe—this will delay the inevitable demise of the VIC. If you use the Data 20 card with commercial software, please write and let me know how well it performs. I'll mention any new "finds" each month. The latest revision of TOTL.LABEL 2.1-6 will work. QBF will work, but will need a short transfer program to be run first. Call QBF for the details. QBF is directly compatible if you use Cardco's 3 slot expansion board and their 16K RAM card. SVK and PractiCalc do not work on 40/80 columns.

Next month we will look at Flex File and, as they say around Christmas time, "some surprises".□

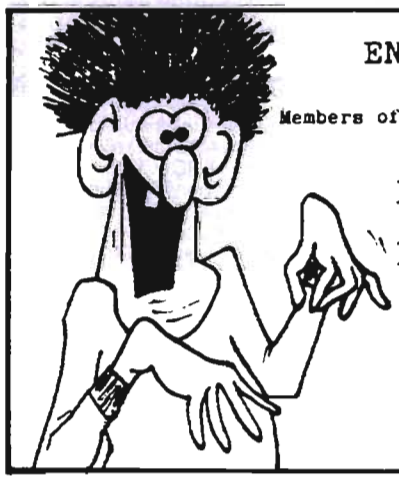

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Figure 1
Summary of Commands for Super VIC-Kit

followed by a decimal number, gives the hexadecimal equivalent.

$ followed by a hexadecimal number, gives the decimal equivalent.

APPEND followed by the program name, appends a program from disk onto a program in memory.

AUTO followed by an increment number, generates automatic line numbers when keying in a program.

BREAK breaks to the machine language monitor.

CATALOG lists the disk directory to the screen, but leaves the current program in memory intact.

DELETE followed by range numbers, deletes blocks of program lines specified by the range.

DLIST followed by a program name, lists that program from disk directly to the screen, leaving the program in memory intact.

DLOAD followed by a program name loads that BASIC program from the disk.

DSAVE followed by a program name saves that BASIC Program to the disk.

FIND followed by a start delimiter, string, end delimiter and optional range, finds any occurence of the string within range and prints that line to the screen.

HEADER followed by disk name, comma, I and a two character ID NEW's the disk with the given name and ID.

INIT initializes the disk drive.

KEY toggles the automatic keyword option.

KILL resets the computer to a cold start.

LIST same as normal list, but may be paused by the space bar.

NUMBER renumbers the entire program according to your increment and default values.

OFF disables Super VIC-Kit.

OLD restores a program lost by inadvertent use of the NEW command.

RENAME followed by an old name, TO and new name, re-

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names a disk program.

SCRATCH scratches (erases) a program from the disk.

SEND followed by a command string, sends that string to the disk drive via the command channel.

SIZE returns the size of the program in memory, exclusive of variables. This is not the same as FRE(0).

STATUS gives a disk error message, or gives nothing if the disk is OK.

Quick Brown Fox Tip

Are you tired of white on black? Try this: from the main menu, type a shifted period. The characters on the screen will change color. Shifted comma and question mark yields two different colors. This should ease your eyestrain.

Figure 2
Automatic Keywords for Super VIC-Kit

A = ASC
B = STEP
C = CHR$
D = DIM
E = END
F = GET
H = STOP
I = INPUT
J = GOTO
K = GOSUB
L = LEFT$
M = MID$
N = NEXT
O = OPEN
P = POKE
Q = PEEK
R = RIGHT$
S = STR$
T = TAB(
U = USR
V = VAL
W = DATA
X = READ
Y = RESTORE
Z = SYS

Figure 3

SECONDARY ADDRESS	FUNCTIONAL MODE
0 (or null)	EMULATE MODE. Same as Commodore's Cursor Up mode. Prints uppercase and graphics symbols. Automatic linefeed at end of each line.
1	EMULATE MODE. Same as 0 except that there is no automatic linefeed at the end of each line.
2	TOTAL TEXT MODE. Prints uppercase letters and prints graphics symbols as either command mnemonics or decimal value. Automatic linefeed at end of each line.
3	TOTAL TEXT MODE. Same as 2 except that there is no automatic linefeed at the end of each line.
4	TOTAL TEXT MODE. Prints both lower and uppercase letters. Otherwise same as 2.
5	TOTAL TEXT MODE. Same as 4 except that there is no automatic linefeed at the end of each line.
6	TRANSPARENT MODE. Sends all data directly from the computer to the printer without any intervention.
7	EMULATE MODE. Same as Commodore's Cursor Down Mode. Prints both lower and uppercase letters and graphics. Automatic linefeed at the end of each line.
8	EMULATE MODE. Same as 7 except that there is no automatic linefeed at the end of each line.

Figure 4
Commodore Commands in The Emulate Mode

There are a number of special commands which are unique to the Commodore 1515 and 1525 printers. The EMULATE MODE duplicates all of these functions except one, inverse alphanumerics. All other functions, however, are supported.

Command	Code	Description
BS	CHR$(8)	Turn on graphics mode
NL	CHR$(10)	Scroll paper up one line
CR	CHR$(13)	Print line and scrolls one line
SO	CHR$(14)	Turn on double width printing
SI	CHR$(15)	Turn off double width & graphics
POS	CHR$(16)	Dot and column TAB
CURSOR DWN	CHR$(17)	Shift to lower/upper case letters
RVS ON	CHR$(18)	Print characters in reverse
SUB	CHR$(26)	Repeat graphics
ESC	CHR$(27)	Used with POS for dot tabbing
CURSOR UP	CHR$(145)	Shift to upper case letters
RVS OFF	CHR$(146)	Print normal characters

Figure 5

(HOM) = HOME
(UP) = UP
(F1) = F1
(F5) = F5
(BLK) = BLACK
(PUR) = PURPLE
(STP) = STOP
(CLR) = CLEAR
(DWN) = DOWN
(F2) = F2
(F6) = F6
(WHT) = WHITE
(GRN) = GREEN
(RON) = REV ON
(INS) = INSERT
(LFT) = LEFT
(F3) = F3
(F7) = F7
(RED) = RED
(BLU) = BLUE
(ROF) = REV OFF
(DEL) = DELETE
(RHT) = RIGHT
(F4) = F4
(F8) = F8
(CYN) = CYAN
(YEL) = YELLOW

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Circle No. 54

Maintenance What Are Your Options Part III

by Tony Lamartina

This is part 3 of a three part series. We've looked at warranty service and non-warranty service. This month we'll examine some maintenance plans and some maintenance steps that you can perform without fear of voiding your warranty or causing damage to your equipment.

Basically, there are two types of maintenance: preventive maintenance and remedial maintenance. Preventive maintenance is corrective action prior to a failure, or a "prevention" of failure. It's just like preventive medicine. By performing certain maintenance steps periodically throughout the life of your equipment, you avoid lengthy down times. Remedial maintenance on the other hand, is the corrective action taken after a failure.

As discussed last month, remedial maintenance is available thru the manufacturer, dealer, third party service company and national dealer service organizations. These organizations are prepared for and in the business of providing service as a product. Unless you are electronically and technically capable, never attempt remedial maintenance yourself. If your equipment is under warranty and you attempt the repair yourself, you will in all likelihood, void the warranty. If your unit is out of warranty, it's your choice. I have seen users attempt repairs and ultimately wind up with a much larger repair bill than if they had left the repair to the experts.

Preventive maintenance can be accomplished, however, by a careful user or through an agreement with one of the service organizations mentioned previously. Before we get into the preventive maintenance steps that you can perform, let's assume for a moment that your system is not functioning correctly. There are a few steps that you should go through prior to lugging your entire system in for service.

1. Isolate the fault—disconnect all peripherals (i.e. tape drive, disc drive and printer). If the computer resumes normal operation, then add the peripherals one at a time until the fault reoccurs. The peripheral that causes the fault to reappear is probably the one that caused the fault to begin with.

2. If the fault is not peripheral related, use the backup copy of your software. Also, if the fault seems to be associated with several peripheral devices, then suspect the software. For instance, a contaminated program diskette may suddenly cause the printer to spew garbage, the drive to run continuously and the computer itself to hang indefinitely. If a fresh copy of the software resumes normal operation, make a fresh backup and get rid of the offending diskette. Don't try to renew the diskette by bulk erasing. While it may appear to be OK, someday that very diskette will come back to haunt you!

3. If problems become intermittent in nature (they come and go), check your line voltage. While computers and computer peripherals have excellent filtering in their power supplies, a very noisy line can cause random and intermittent problems to occur. Many computerists may have their set up in the basement, where the washing machine or some other such appliance may be on the same circuit. Appliance motors turning off and on can place large

spikes on the line and wreak havoc with your computer.

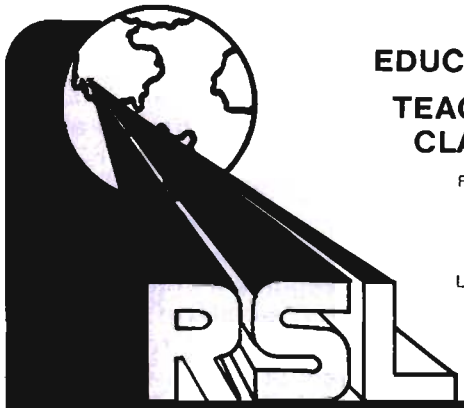
4. Check all interconnecting cables for tightness of fit and plug orientation. One case involves a person who could not get the disc drive to respond. A "device not present error" kept occurring. Everything was checked and checked again. The end result was that the PET to IEEE cable was upside down at the computer end. Commodore does not mark which end is up!

5. Check all switches and switch positions. This may sound odd but every now and then, someone brings a unit in and the switch was in off position! By the same token, check the fuse. A fuse of the same type and rating can easily be installed by the user. Sometimes fuses may open due to a one time line surge (lighting) or simply open with age.

If the replacement fuse does not open right away, chances are everything is OK. If, however, the fuse immediately opens again or consistently fails about once a day or once a week, the unit is in need of service.

Besides checking and replacing fuses, there are several more preventive measures that will help cut those repair bills down. One step that you can take is not to wear wool clothing while operating your computer. Wool clothing builds up static electricity rather quickly. If you become "statically charged" and touch a metal switch post on your computer or peripheral, you may transmit several hundred to a thousand volts of static charge directly to your unit causing chip and component failures.

Never smoke around your computer. Nicotine and tar, being by-products of smoking, will be deposited on internal as well as external surfaces of the computer, printer or drive. A particle of smoke looks like a boulder sized rock to the drive head as it speeds across the disk surface. A particle of smoke can physically jar the drive head causing loss of data or



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a read or write error. Also, the sticky substance of tar and nicotine can readily gum up the mechanical action of keyboard keys, printer mechanisms and print head action.

One particular instance comes to mind in relation to smoking and computers. A customer brought his computer in for repair. The complaint was the display was very dim. After checking all the power supply voltages and circuitry, the problem persisted. A careful visual perusal of the problem revealed a display tube face so coated with tar and nicotine, it was a wonder one could see anything! Cleaning the glass picture tube face cured the problem, maximum brightness and clarity!

Let's look at your computer system's components box by box. The computer itself, or CPU as it's sometimes called, is probably the most troublefree component. There are no moving parts to wear out and the electronics as a whole are very reliable. About the only maintenance that you can perform on the CPU itself is fuse replacement and keeping the exterior surfaces clean. Use dust covers and avoid dusty environments.

Also, **never** open your computer, especially the video display cover. Within the display tube compartment, there are voltages in excess of 12,000 volts. Contacting these voltages can cause serious injury. Opening the lower computer compartment has its hazards too. While only low voltages are present, it's very easy for the top display section of the computer case (which is hinged to the upper box) to get away from you and rock backward jarring the display tube, possibly causing a crack in the tube and the display cover will certainly break off. Simply put, for safety reasons and warranty considerations, don't open the computer unless you have the training and are technically capable of performing repairs.

Tape and disk drives basically require the same considerations, although the disk drive is much more sensitive to these considerations. The tape drive, being mechanical in nature, depends on proper alignment of its read/write head for accurate operation. Smoke, dust and foreign objects can eventually ruin the internal workings of a tape unit. You can clean the heads of the tape unit with a soft swab and denatured alcohol. Be very careful and swab the head of the tape drive. Allow to air dry.

Proper alignment of the head should be attempted only by qualified service people. One indication that your tape drive is in need of head alignment is when a tape recorded on your tape drive will not load properly from another drive. One of the two drives is out of alignment. Usually a third drive is needed to determine which is at fault.

Contaminated tapes are another source of trouble. Fingerprints on the recorded tape can cause contamination. The skin oils from your fingertips can cause disruption of the recorded data. One sure fire prevention method when saving any data, be it on tape drive or disk drive, is to make use of the verify command. You'll always know that the just recorded data is exactly the same as the data in memory.

Printers can be either very reliable or very unreliable. Printers are very mechanical and not very well protected from outside dust and dirt. The print mechanisms are within reach of falling objects, curious hands, fingers and spilled fluids. The best preventive medicine here is the use of dust covers. In fact, the use of dust covers for all your equipment is highly recommended.

As a user, you should be able to clean the exterior and the print mechanism. There are several good printer cleaning kits on the market. Minor lubrication can be accomplished by the user, also. Clean and dust the air intake vents and clean the filters in mild soap and water. In depth preventive maintenance should be performed by qualified service personnel each 6 months or 500 hours usage.

Some preventive steps you can take are: keep it clean, change the ribbon when print becomes light, do not print reverse characters too long, (reverse character printing causes extreme printhead heat and eventual failure) and check for proper carriage alignment.

Disk drives are the most troublesome of all computer equipment. Disk drives are not very tolerant of dust, dirt and mis-alignment. Under ideal conditions, a disk drive would run 8,000 hours on the average between repairs! Ideally, a disk would last for several million passes over the same track without any degradation in data integrity!

In practice, however, conditions are far from ideal. The disk drive should have preventive maintenance performed every 40 hours of operation by a qualified service technician. As a user, however, you could purchase s commercially available head cleaning disk and use it every 20 hours of operation or about once every two to four weeks. Tandon, Shugart and Micropolis have all stated through memorandum that the "proper" use of head cleaning kits will not void the warranty. This simple preventive maintenance step can greatly expand the life of your drive and disk media.

The 8050 and 8250 drives, by virtue of their format (77 track), are more sensitive to proper drive alignment than the 4040, 2031 or 1540/41 disk drives (40 track).

Periodically, you should run the performance test for your drive included on the test/demo diskette supplied when you purchased your equipment. These tests will verify belt tension, motor speed and error detection circuits and components of the drive unit. Avoid vibration and shock when

transporting disk drives.

Inspect diskettes frequently. If there is any doubt, throw it out and make a fresh backup. Diskette life depends on several factors: the environment, condition of the disk drive and quality of the disk itself. Sometimes, it's a vicious circle. A contaminated disk can cause problems for the disk drive, and a dirty disk drive can contaminate and ruin a disk!

Basic preventive measures, then, for disk drives include head cleaning disks, clean environment, periodic performance tests and a dust cover.

So, now you have had a look at computer maintenance, who's in the business, what they can and can't do for you and what you can do for yourself. The ever changing computer maintenance market is highly competitive. Do what you can to keep your equipment up and running, through good preventive maintenance practices and when you do need service, consider your options and shop around.□

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Circle No. 99

Phone Directory: Utilizing Relative Files

by Howard Rotenberg

The following program is a personal phone directory using relative files. It is not very complicated, but does show how to use relative files in an application that may be useful to many people. In this example, I chose to use only two fields, the person's name and phone number. It may be expanded upon if you wish. There is one prerequisite to using this program, and that is to initially open the relative file that we will be using. The name of the file used in this program is called phones. For those who are not familiar with the opening of this type of files, the following is a quick example.

Opening the File:

```
10 DOPEN#1,"FILENAME",
   150
20 REM BASIC 4 OPEN
   STATEMENT
25 REM LOGICAL FILE #
35 REM NAME OF FILE
45 REM SPECIFIES REL
55 REM LENGTH OF EACH
   RECORD
60 RECORD#1,100,40
70 REM ALLOCATE SPACE
   FOR 100 RECORDS
80 REM GO TO END OF
   RECORD
```

```
10 GOTO70
20 SAVE"@0:PHONE #16",8:STOP
30 GOSUB"PHONES"
40 RESTORE"PHONES BACKUP" TO "PHONES"
50 READ "PHONES" TO "PHONES BACKUP"
60 STOP
70 REM  ********************************
80 REM  *         PHONE #16              *
90 REM  *  EXAMPLE OF RELATIVE FILES *
100 REM *   USING A PHONE DIRECTORY  *
110 REM *  LAST UPDATE OCTOBER 9/82  *
120 REM ********************************
130 PRINT"[CLEAR]"
140 SP$="
                                       "
150 DW$="[HOME][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DO
WN][DOWN][DOWN]"
160 FOR#1,"PHONES"
170 IFDSTHENPRINTDS$:PRINT "PLEASE CHEC
K DISK DRIVE":END
180 DATA#1,1
190 INPUT#1,NR
200 DIM S1$(NR+50),S2$(NR+50)
210 REM
220 REM*********************************
230 REM*         MAIN MENU              *
240 REM*********************************
250 REM
260 PRINT"[CLEAR]"TAB(31)"PHONE DIRECTO
RY":LINE=4
270 PRINTTAB(31)"──────────────────"
280 PRINT"[DOWN][DOWN][DOWN][DOWN][DOWN
]"
```

To be continued on page 62

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CAT #	TOPIC	COMPUTER
BP-3	Programming in BASIC	COMMODORE 64
BP-4	Programming in BASIC	VIC-20

BASIC INSTRUCTION VIDEO TAPE TOPICS INCLUDE

FN LET RND END ABS AND THEN LIST STOP PRINT RESTORE IF NEW RUN EXP ASC ATN OPEN CHR$ STR$ GOSUB RETURN ON NOT SGN FOR CLR COS PEEK CONT LOAD CLOSE RIGHT$ OR REM SIN FRE DEF DIM POKE DATA MID$ INPUT VERIFY SPC GET INT LEN LOG GOTO NEXT SAVE READ LEFT$ TIME$ SQR TAB TAN VAL POS STEP TIME PEEK

CAT #	TOPIC	COMPUTER
DIO-1	DISK I/O	COMMODORE 64
DIO-2	DISK I/O	VIC-20

Includes RANDOM, RELATIVE, SEQUENTIAL disk read and write. Also explains load, save, new, copy, scratch, initialize, validate, error channel, command channel, and rename in both the standard and wedge syntax. Explains the verify, open, print #, input #, get #, status BAM commands. Lesson includes several programs and a large checkbook program.

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```
85 PRINT#,CHR$(255)
95 CREATE ALL THOSE
   RECORDS
100 DCLOSE
110 REM CLOSE THE FILE
```

You may, of course, choose to make the record size larger or smaller depending upon your needs. After opening this file we are now ready to use the program.

The Program:

The program when first run comes up with a main menu with six selections. These are:

1) INPUT A NUMBER
2) RETRIEVE A RECORD
3) DELETE RECORD
4) EDIT A RECORD
5) SORT ALL RECORDS
6) QUIT

Each of these selections has its own subsection which we will discuss as we get into the program.

Input a Number:

This section allows the user to enter the names and phone numbers of their choosing. When this and any subsection is used the current number of records is always displayed for your information. I chose to use the very first record in the file to hold this number. This section is divided into three subsections as follows:

1) ADD TO RECORD LIST
2) FILL IN OPEN RECORDS
3) BACK TO MENU

When you add a record to the list as in option #1, you simply add the new record to the end of your current phone list. Option #2, however, allows you to fill in any empty records that might have been left over from deleting names. The way this is done is as follows: if you have previously deleted a record and chose to leave the record open as opposed to updating all records, then this record is flagged with a chr$(1). When attempting to fill in these records, the record numbers are checked for this flag and displayed at the same time. If an empty record is found, then it is filled with your current name and number you are about to enter. If no empty records are found, then you are informed and you go back

Continued from page 60

```
290 PRINTTAB(31)"[REV]I[OFF]NPUT A NUMB
ER[DOWN]"
300 PRINTTAB(31)"[REV]R[OFF]ETRIEVE A R
ECORD[DOWN]"
310 PRINTTAB(31)"[REV]D[OFF]ELETE RECOR
D[DOWN]"
320 PRINTTAB(31)"[REV]E[OFF]DIT A RECOR
D[DOWN]"
330 PRINTTAB(31)"[REV]S[OFF]ORT ALL REC
ORDS[DOWN]"
340 PRINTTAB(31)"[REV]Q[OFF]UIT"
350 PRINT
360 GETA$:IFA$=""THEN360
370 IFA$="Q"THENNEXT:END
380 IFA$<>"I"ANDA$<>"R"ANDA$<>"D"ANDA$<
>"E"ANDA$<>"S"THEN360
390 IFA$="E"THEN3320
400 IFA$="D"THEN1680
410 IFA$="R"THEN880
420 IFA$="S"THEN4170
430 REM
440 REM*********************************
450 REM*     NEW RECORD INPUT          *
460 REM*********************************
470 REM
480 PRINT"[CLEAR]"TAB(31)"NEW RECORD IN
PUT"
490 PRINTTAB(31)"──────────────────"
500 DATA#1,1
510 INPUT#1,NR
520 PRINTTAB(20)"NUMBER OF RECORDS ="NR
"  (END) FOR MENU"
530 PRINT"[DOWN][DOWN][DOWN][DOWN]"
540 PRINTTAB(31)"[DOWN][REV]A[OFF]DD TO
 RECORD LIST[DOWN]"
550 PRINTTAB(31)"[REV]F[OFF]ILL IN OPEN
 RECORDS[DOWN]"
560 PRINTTAB(31)"[REV]B[OFF]ACK TO MENU
[DOWN]"
570 GETA$:IFA$<>"A"ANDA$<>"B"ANDA$<>"F"
THEN570
580 IFA$="F"THEN2940
590 IFA$="B"THEN260
600 PRINT
610 INPUT"NAME ";N$
620 IFN$="END"THEN260
630 INPUT"PHONE ";P$
640 PRINT
650 PRINT"NAME ";N$"              PHONE# "
;P$
660 PRINT
670 INPUT"CORRECT (Y OR N) [RIGHT][RIGH
T][RIGHT]Y[LEFT][LEFT][LEFT]";C$
680 IFC$="N"THEN480
690 DATA#1,(NR+2)
700 PRINT#1,N$
```

To be continued on page 64

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into the menu. At this point you may either add it to the end of the list or go back to the main menu. Before any record is entered, the information you have entered is redisplayed for your confirmation before writing it to the file.

Retrieve a Record:

This section allows the user to recall any or all records on file. It is split up into the following subsections:

1) NAME
2) PHONE NUMBER
3) ALL RECORDS
4) BACK TO MENU

From the selections, it is obvious how you may choose to recall a record. You may enter the name of the person, the phone number (for those of us that remember a phone number but forget to whom it belongs) or choose to see all records present. The third choice is by far the most versatile. It allows you to display all records present or get a hard copy of the names and phone numbers on hand. It has a special feature that allows you to use pattern matching. For those of you not familiar with this term, it simply means that you may choose to display all names that start with a D or any names that start with any pattern you chose. For example, if you chose the pattern DA you would see the numbers of people as such: Danny Smith, Daffy Duck, Dandy Candy and not to forget Dear old DAD. (ALL NAMES ARE FICTITIOUS AND HAVE BEEN CHANGED TO PROTECT THE INNOCENT.) If you choose to display all or some of the names, only twenty at a time will be on the screen at any one time to prevent scrolling. You may then move on by pressing return.

Delete Record:

This command like the others is spread out into other subsections. These are:

1) NAME
2) PHONE NUMBER
3) SCAN
4) BACK TO MENU

Once again, you may choose to delete a record by the person's name or by the phone number if

Continued from page 62

```
710 DATA#1,(NR+2),35
720 PRINT#1,P$
730 REM
740 REM*********************************
750 REM*     UPDATE RECORD NUMBER      *
760 REM*********************************
770 REM
780 IFERTHENER=0:GOTO810:REM*EMPTY RECO
RD FILLED SO DONT INCREMENT COUNTER**
790 DATA#1,1
800 PRINT#1,NR+1
810 PRINTTAB(29)"[DOWN]RECORD ENTERED"
820 FORJ=1TO2000:NEXT:I=0:GOTO480
830 REM
840 REM*********************************
850 REM*        RETRIEVE RECORDS       *
860 REM*********************************
870 REM
880 PRINT"[CLEAR]"TAB(31)"RETRIEVE RECO
RDS":LINE=1
890 PRINTTAB(31)"──────────────────────"
900 PRINTTAB(29)NR" RECORDS PRESENT"
910 PRINT
920 PRINT"[DOWN][DOWN][DOWN][DOWN][DOWN
]"
930 PRINTTAB(31)"[REV]N[OFF]AME[DOWN]"
940 PRINTTAB(31)"[REV]P[OFF]HONE NUMBER
[DOWN]"
950 PRINTTAB(31)"[REV]A[OFF]LL RECORDS[
DOWN]"
960 PRINTTAB(31)"[REV]B[OFF]ACK TO MENU
"
970 GETA$:IFA$=""THEN970
980 IFA$<>"N"ANDA$<>"P"ANDA$<>"A"ANDA$<
>"B"THEN970
990 IFA$="B"THENGOTO260
1000 IFA$="N"THENTM$="NAME":GOTO1360
1010 IFA$="P"THENTM$="PHONE #":GOTO1360
1020 REM
1030 REM*********************************
1040 REM*           ALL RECORDS         *
1050 REM*********************************
1060 REM
1070 PRINT"[CLEAR]":
1080 INPUT"PRINTER OR CRT [RIGHT][RIGHT
][RIGHT]C[LEFT][LEFT][LEFT]";DV$:PRINT"
[CLEAR]"
1090 INPUT"PATTERN MATCHING   Y[LEFT][L
EFT][LEFT]";A$
1100 IFA$="Y"THENINPUT"ENTER PATTERN
*[LEFT][LEFT][LEFT]";PM$:PM=1
1110 IFPM$="*"THEN1300
1120 LN=LEN(PM$):V$="Z"
1130 IFDV$="P"THENOPEN2,4:GOTO1150
1140 OPEN2,3
1150 PRINT#2,"  NAME"TAB(40)"NUMBER"
```

To be continued on page 66

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you recall it. If the record chosen to be deleted is present, then you are asked to confirm it before it is actually deleted. If you decide to delete the record then you are given two more choices on the method of deletion. This is the part that was discussed earlier during the input record when it came to adding to the list or filling in empty records. Your two choices are:

1) UPDATE ALL RECORDS
2) DELETE PRESENT RECORD

If you choose to update all the records this is what happens. If you have 20 records and you are deleting number 10, then each successive record is put in its predecessor's place. This means record number 11 is now in record 10's old position, record 12 is in 11's and so on down to the last record. If you choose number 2 then the records remain intact and that record is flagged with the chr$(1) and remains open to be filled in at a later time.

Choice number 2 is much quicker, especially if you have a large number of records. The third choice is to scan the records. By this statement I mean we will sequentially display each record and ask if it is the record you want to delete until we find it or reach the end of the file. The current record number is always being updated by any of our actions. Before we go on to the next command in the menu, I would just like to backtrack and mention that you may not update all records if the record chosen to delete was the last record.

Edit a Record:

The phone directory or any file system would not be complete without the capability to edit your records. The section on editing records has 4 subsections once more. These sections are as follows:

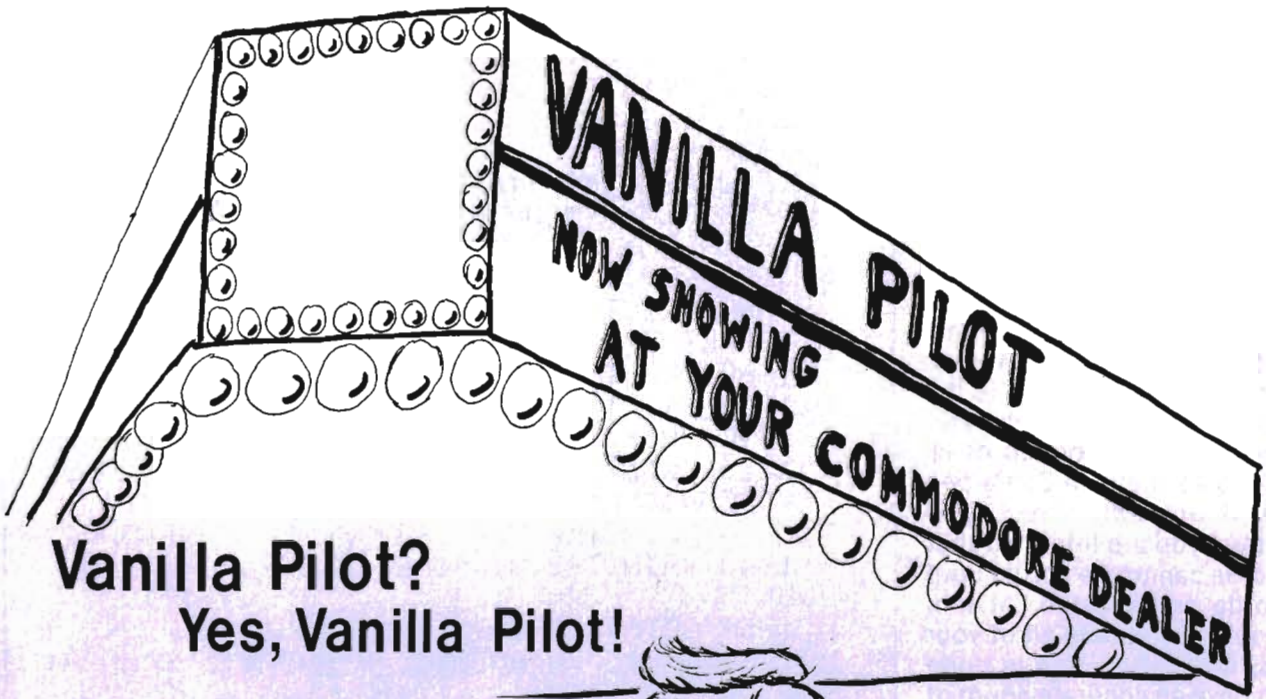
1) NAME
2) PHONE
3) SCAN
4) BACK TO MENU

These sections work just the same as the preceding one on deleting records. Once again, you may choose to search for a record

Continued from page 64

```
1160 PRINT#2," ————"TAB(40)"————[DOW
N]"
1170 FORT=2TONR+1
1180 DATA#1,(T)
1190 INPUT#1,N$
1200 IFN$=CHR$(1)ORN$=CHR$(255)THENPRIN
TTAB(20)"RECORD #"I+1" EMPTY":GOTO1270
1210 DATA#1,(T),35
1220 INPUT#1,P$
1230 IFDV$="P"THENC%=45-LEN(N$):GOTO125
0
1240 C%=38-LEN(N$)
1250 IFPMTHENIFLEFT$(N$,LN)=PM$THENPRIN
T#2,N$;SPC(C%);P$" "I+1:V$=N$:GOTO1270
1260 IFPM=0THENPRINT#2,N$;SPC(C%);P$" "
I+1
1270 I=I+1:K=K+1:IFDV$="C"THENIFK=20THE
NIFPM=0THEN1590
1280 IFPMTHENIFN$>V$THENT=T+1000
1290 NEXTT
1300 N=0:I=0:K=0:PM=0:CLOSE2:GOTO1560
1310 REM
1320 REM*********************************
1330 REM*     RETRIEVAL BY FIELD      *
1340 REM*********************************
1350 REM
1360 PRINT"[DOWN]"TM$;
1370 INPUTRS$
1380 IFTM$="NAME"THENP=1:X=35:N=1
1390 IFTM$="PHONE #"THENP=35:X=1:N=0
1400 FORT=2TONR+1
1410 DATA#1,(T),(P)
1420 INPUT#1,PR$
1430 IFPR$=RS$THENG=T:T=NR+1000
1440 NEXTT
1450 IFT=NR+2THENGOTO1620:REM**NOT FOUN
D**
1460 DATA#1,(G),(X)
1470 PRINT
1480 INPUT#1,PN$
1490 IFNTHENPRINTPR$TAB(30)PN$
1500 IFN=0THENPRINTPN$TAB(30)PR$
1510 REM
1520 REM*********************************
1530 REM*        WAIT ROUTINES          *
1540 REM*********************************
1550 REM
1560 POKE158,0:PRINTTAB(26)"[DOWN][REV]
PRESS RETURN TO CONTINUE[OFF]"
1570 GETA$:IFA$<>CHR$(13)THEN1570
1580 N=0:ONLINEGOTO880,1680,3320,260
1590 POKE158,0:PRINTTAB(22)"[DOWN][REV]
PRESS RETURN TO CONTINUE LISTING[DOWN][
OFF]"
1600 GETA$:IFA$<>CHR$(13)THEN1600
```

To be continued on page 68



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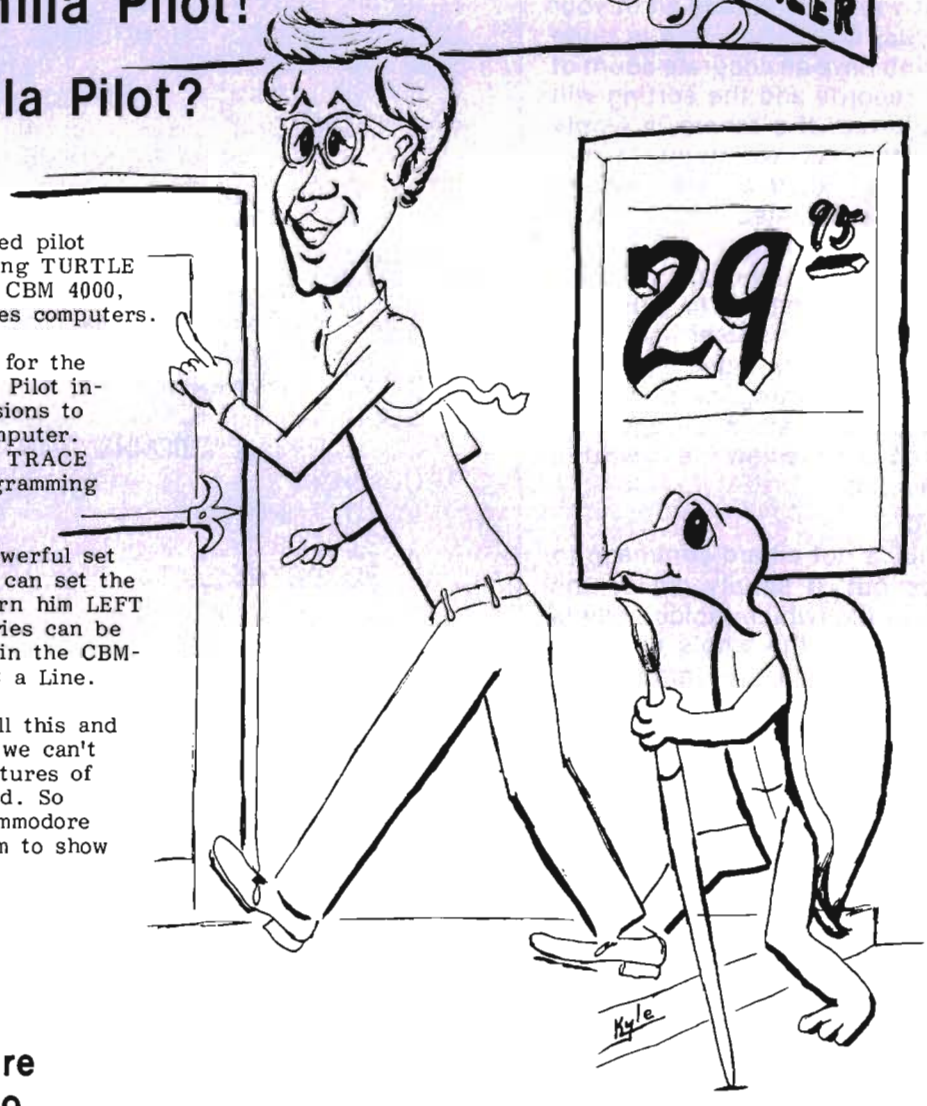

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to edit by a name, phone number or sequential scan of all present records. As with all changes that will be reflected in your file, you are given a chance to abort the change before it is written to disk. When you have finished editing a record you are informed that the record has been updated.

Sort All Records:

This selection unlike the other commands has no subsections. When the command is invoked, the first thing that is done is the reading of the current file into memory. You are informed of all operations as they are being performed. If any empty record is found, then you are informed that the records cannot be sorted until all records are updated. At this point you must update all of your records. Only when this is done will you have an accurate count of your records and the sorting will be allowed. If a record is empty then the record count is not decremented. If all was well or you have updated your records then the sorting procedure begins. While the records are being sorted I chose to print out dashes to let the user know that the computer is indeed working. When the sorting procedure is finished, you are once again informed and the new file is written to the disk.

Quit:

This is not a hard command to figure out. It simply closes the relative file (which incidentally is open during the whole program) and then ends the program.

In this phone directory, I chose to allow 35 characters for the name, and 15 for the phone number. This should allow for the longest of names and any phone number along with the area code to be entered. If you anticipate needing larger fields for your file then you must consider this when you first open your file and also change all the record positions at 35 to your new position.

Conclusion:

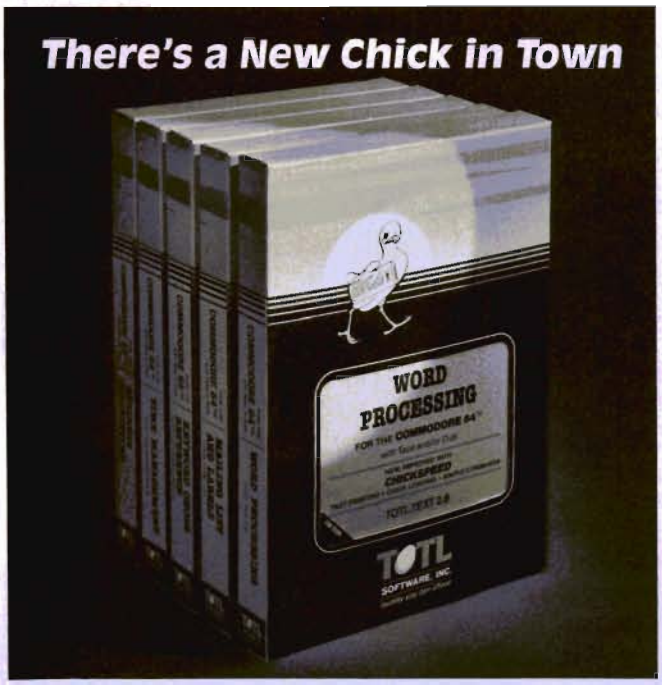
As I had mentioned at the beginning of this article, I have only touched upon the use of relative files. The way they are be-

Continued from page 66

```
1610 K=0:GOTO1290
1620 PRINTTAB(29)"[DOWN]RECORD NOT PRES
ENT":I=0:GOTO1560
1630 REM
1640 REM*********************************
1650 REM*  MENU FOR RECORD DELETION  *
1660 REM*********************************
1670 REM
1680 PRINT"[CLEAR]"TAB(31)"DELETE RECOR
DS":LINE=2
1690 PRINTTAB(31)"──────────────────"
1700 PRINT
1710 PRINTTAB(31)"[REV]N[OFF]AME[DOWN]"
1720 PRINTTAB(31)"[REV]P[OFF]HONE NUMBE
R[DOWN]"
1730 PRINTTAB(31)"[REV]S[OFF]CAN[DOWN]"
1740 PRINTTAB(31)"[REV]B[OFF]ACK TO MEN
U"
1750 GETA$:IFA$=""THEN1750
1760 IFA$<>"N"ANDA$<>"P"ANDA$<>"S"ANDA$
<>"B"THEN1750
1770 IFA$="N"THENTM$="NAME":P=1:X=35:N=
1:GOTO1860
1780 IFA$="P"THENTM$="PHONE #":P=35:X=1
:N=0:GOTO1860
1790 IFA$="S"THEN2720
1800 GOTO260
1810 REM
1820 REM*********************************
1830 REM*SEARCH FOR RECORDS TO DELETE*
1840 REM*********************************
1850 REM
1860 PRINT"[DOWN]"TM$;:REM**LOOK FOR RE
CORDS**
1870 INPUTRS$
1880 FORT=2TONR+1
1890 DATA#1,(T),(P)
1900 INPUT#1,PR$
1910 IFPR$=RS$THENG=T:T=NR+1000
1920 I=I+1:REM**COUNTER FOR RECORD NO.*
*
1930 NEXT T
1940 IFT=NR+2THEN1620:REM**NOT FOUND**
1950 REM
1960 REM*********************************
1970 REM*   PRINT OUT RECORD AND    *
1980 REM*    QUERY FOR DELETION     *
1990 REM*********************************
2000 REM
2010 DATA#1,(G),(X)
2020 PRINT
2030 INPUT#1,PN$
2040 PRINTTAB(31)"RECORD NUMBER"I
2050 PRINTTAB(31)"──────────────────"
2060 IFNTHENPRINTPR$TAB(30)PN$:GOTO2080
```

To be continued on page 70

There's a New Chick in Town



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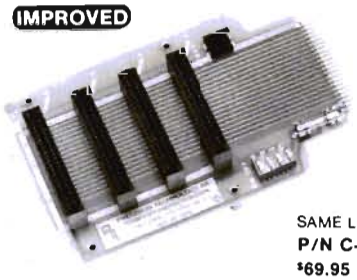

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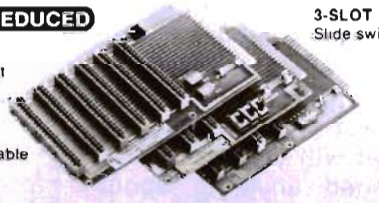

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ing used here is not really direct access since we usually have to search for the name or number. Only when we are editing records etc. do we really use direct access to replace the old record. The real effectiveness of relative files comes into play when you know the record number or can calculate it easily. When this is the case, then you can say get record number 55 and it will be done. An example of an application that needs this type of direct access would be an inventory package. If you want to know the price of a certain number, you enter the code and it immediately gets it. In a future article I will include a direct access inventory package that will do this. I have not mentioned anything about side sectors that relative files use since this was just a taste of what they can do. If there is interest in how files such as these or any other type (including programs) are stored on disk then please feel free to contact me through Commander. Until next time, Happy computing.□

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Continued from page 68

```
2070 PRINTPN$TAB(30)PR$
2080 PRINT
2090 INPUT"DELETE THIS RECORD [RIGHT][R
IGHT][RIGHT]Y[LEFT][LEFT][LEFT]";DR$
2100 IFDR$<>"Y"THENI=0:GOTO1680
2110 INPUT"ARE YOU SURE [RIGHT][RIGHT][
RIGHT]Y[LEFT][LEFT][LEFT]";DR$
2120 IFDR$<>"Y"THENI=0:GOTO1680
2130 REM
2140 REM*********************************
2150 REM*    MINI MENU FOR DELETION   *
2160 REM*********************************
2170 REM
2180 PRINTTAB(29)"[REV]U[OFF]PDATE ALL
RECORDS[DOWN]"
2190 PRINTTAB(29)"[REV]D[OFF]ELETE PRES
ENT RECORD[DOWN]"
2200 GETA$:IFA$<>"U"ANDA$<>"D"THEN2200
2210 IFA$="U"THEN2410
2220 PRINTTAB(29)"[DOWN]DELETING PRESEN
T RECORD"
2230 DATA#1,(I+1)
2240 PRINT#1,CHR$(1)
2250 DATA#1,(I+1),35
2260 PRINT#1,CHR$(1)
2270 I=0:FORJ=1TO2000:NEXT:GOTO1680
2280 REM
2290 REM*********************************
2300 REM*        DELETE RECORD          *
2310 REM*  AND UPDATE THE EXISTING      *
2320 REM*   RECORDS BY READING THE      *
2330 REM* NEXT ONE INTO THE DELETED     *
2340 REM*           RECORD              *
2350 REM*********************************
2360 REM
2370 REM*********************************
2380 REM*        REPLACE NAME           *
2390 REM*********************************
2400 REM
2410 PRINTTAB(29)"[DOWN]UPDATING ALL RE
CORDS"
2420 IFI=NRTHENPRINTTAB(18)" CANNOT UPD
ATE! THIS WAS THE LAST RECORD"
2430 IFI=NRTHENFORJ=1TO2000:NEXT:I=0:GO
TO1680
2440 FORT=I+2TONR+1
2450 DATA#1,(T)
2460 INPUT#1,DN$
2470 DATA#1,(T-1)
2480 PRINT#1,DN$
2490 REM
2500 REM*********************************
2510 REM*    REPLACE PHONE NUMBER     *
2520 REM*********************************
2530 REM
```

Continued from page 72

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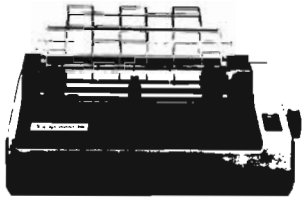

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Continued from page 70

```
2540 DATA#1,(T),35
2550 INPUT#1,DP$
2560 DATA#1,(T-1),35
2570 PRINT#1,DP$
2580 NEXTT:I=0
2590 REM
2600 REM*********************************
2610 REM*    RESET RECORD NUMBER    *
2620 REM*********************************
2630 REM
2640 DATA#1,1
2650 PRINT#1,NR-1
2660 NR=NR-1:GOTO1680
2670 REM
2680 REM*********************************
2690 REM*  SCAN FOR RECORD TO DELETE *
2700 REM*********************************
2710 REM
2720 PRINT"[DOWN][DOWN][DOWN]"
2730 FORT=2TONR+1
2740 DATA#1,(T)
2750 INPUT#1,N$
2760 IFN$=CHR$(1)THENT=T+1:I=I+1:GOTO027
40
2770 DATA#1,(T),35
2780 INPUT#1,P$
2790 I=I+1
2800 PRINT"RECORD#"I;"  ";N$,SPC(10)P$
2810 INPUT"[DOWN]DELETE THIS RECORD[RIG
HT][RIGHT][RIGHT]N[LEFT][LEFT][LEFT]";D
R$
2820 IFDR$<>"Y"THEN2850
2830 INPUT"ARE YOU SURE[RIGHT][RIGHT][R
IGHT]Y[LEFT][LEFT][LEFT]";DR$
2840 IFDR$="Y"THENT=NR+1000:GOTO2180
2850 PRINTDW$:PRINTSP$:PRINT"[UP][UP]":
NEXTT
2860 IFT=NR+2THENPRINTTAB(31)"END OF FI
LE"
2870 FORJ=1TO2000:NEXT
2880 I=0:GOTO1680
2890 REM
2900 REM*********************************
2910 REM*    SCAN FOR OPEN RECORD    *
2920 REM*********************************
2930 REM
2940 FORT=2TONR+1
2950 DATA#1,(T)
2960 INPUT#1,BL$
2970 I=I+1
2980 PRINT"[DOWN]"TAB(31)"CHECKING RECO
RD"I
2990 PRINTTAB(31)"————————————————
3000 IFBL$=CHR$(1)THENT=NR+1000:GOTO307
0
```

Continued from page 74

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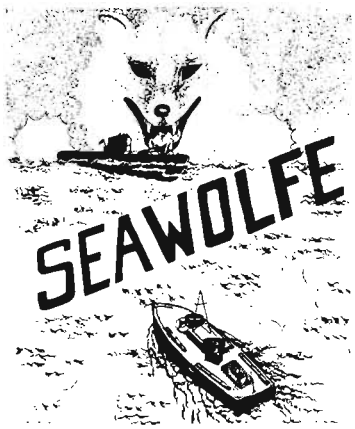

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Continued from page 72

```
3010 PRINT"[UP][UP][UP][UP]"
3020 NEXTT
3030 PRINT"[DOWN]"
3040 PRINT"[DOWN]"TAB(29)"NO EMPTY RECO
RDS PRESENT":I=0
3050 FORJ=1TO3000:NEXT
3060 GOTO480
3070 REM
3080 REM*********************************
3090 REM*   FILL IN EMPTY RECORDS     *
3100 REM*********************************
3110 REM
3120 PRINT"[CLEAR]"TAB(22)"RECORD BEING
 PLACED INTO RECORD #"I
3130 PRINTTAB(22)"──────────────────
──────────"
3140 INPUT"NAME";N$
3150 IFN$="END"THENI=0:GOTO260
3160 INPUT"PHONE";P$
3170 PRINT
3180 PRINT"NAME ";N$"          PHONE# "
;P$
3190 PRINT
3200 INPUT"CORRECT (Y OR N) [RIGHT][RIG
HT][RIGHT]Y[LEFT][LEFT][LEFT]";C$
3210 IFC$<>"Y"THENGOTO3120
3220 DATA#1,(I+1)
3230 PRINT#1,N$
3240 DATA#1,(I+1),35
3250 PRINT#1,P$
3260 ER=1:GOTO780
3270 REM
3280 REM*********************************
3290 REM*  MENU FOR EDITING RECORDS   *
3300 REM*********************************
3310 REM
3320 PRINT"[CLEAR]"TAB(31)"EDIT RECORDS
":LINE=3
3330 PRINTTAB(31)"──────────────"
3340 PRINT
3350 PRINTTAB(31)"[REV]N[OFF]AME[DOWN]"
3360 PRINTTAB(31)"[REV]P[OFF]HONE[DOWN]
"
3370 PRINTTAB(31)"[REV]S[OFF]CAN[DOWN]"
3380 PRINTTAB(31)"[REV]B[OFF]ACK TO MEN
U"
3390 GETA$:IFA$=""THEN3390
3400 IFA$<>"N"ANDA$<>"P"ANDA$<>"S"ANDA$
<>"B"THEN3320
3410 PRINT
3420 IFA$="N"THENTM$="NAME":P=1:X=35:N=
1:GOTO3460
3430 IFA$="P"THENTM$="PHONE":P=35:X=1:N
=0:GOTO3460
3440 IFA$="S"THEN3770
3450 GOTO260
```

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Continued from page 74

```
3460 REM
3470 REM*********************************
3480 REM*        EDIT BY FIELD          *
3490 REM*********************************
3500 REM
3510 PRINT"[DOWN]"TM$;
3520 INPUTRS$
3530 FORT=2TONR+1
3540 DATA#1,(T),(P)
3550 INPUT#1,PR$
3560 IFPR$=RS$THENG=T:T=NR+1000
3570 I=I+1
3580 NEXTT
3590 IFT=NR+2THEN1620
3600 DATA#1,(G),(X)
3610 INPUT#1,PN$
3620 PRINTTAB(31)"RECORD NUMBER"I
3630 PRINTTAB(31)"————————————————"
3640 IFNTHENPRINTPR$TAB(30)PN$:GOTO3660
3650 PRINTPN$TAB(30)PR$
3660 PRINT
3670 INPUT"EDIT THIS RECORD[RIGHT][RIGH
T]Y[LEFT][LEFT][LEFT]";ER$
3680 IFER$<>"Y"THENI=0:GOTO3320
3690 INPUT"ARE YOU SURE [RIGHT][RIGHT]Y
[LEFT][LEFT][LEFT]";ER$
3700 IFER$<>"Y"THENI=0:GOTO3320
3710 GOTO3990
3720 REM
3730 REM*********************************
3740 REM* SCAN FOR RECORD TO EDIT       *
3750 REM*********************************
3760 REM
3770 PRINT"[DOWN][DOWN]"
3780 FORT=2TONR+1
3790 DATA#1,(T)
3800 INPUT#1,N$
3810 IFN$=CHR$(1)THENT=T+1:I=I+1:GOTO37
90
3820 DATA#1,(T),35
3830 INPUT#1,P$
3840 I=I+1
3850 PRINT"RECORD#"I;"  ";N$,SPC(10)P$
3860 INPUT"[DOWN]EDIT THIS RECORD[RIGHT
][RIGHT]N[LEFT][LEFT][LEFT]";ER$
3870 IFER$<>"Y"THEN3900
```

```
3880 INPUT"ARE YOU SURE[RIGHT][RIGHT]Y[
LEFT][LEFT][LEFT]";ER$
3890 IFER$="Y"THENT=NR+1000:GOTO3990
3900 PRINTDW$:PRINTSP$:PRINT"[UP][UP]":
NEXTT
3910 IFT=NR+2THENPRINTTAB(31)"END OF FI
LE"
3920 FORJ=1TO2000:NEXT:
3930 I=0:GOTO3320
3940 REM
3950 REM*********************************
3960 REM*        EDIT RECORD            *
3970 REM*********************************
3980 REM
3990 INPUT"NAME ";N$
4000 IFN$="END"THENI=0:GOTO3320
4010 INPUT"PHONE ";P$
4020 PRINT"NAME ";N$"          PHONE# ";
P$
4030 INPUT"CORRECT (Y OR N)[RIGHT][RIGH
T]Y[LEFT][LEFT][LEFT]";C$
4040 IFC$<>"Y"THENI=0:GOTO3320
4050 PRINTTAB(31)"RECORD UPDATED"
4060 FORJ=1TO2000:NEXTJ
4070 DATA#1,(I+1)
4080 PRINT#1,N$
4090 DATA#1,(I+1),35
4100 PRINT#1,P$
4110 I=0:GOTO3320
4120 REM
4130 REM*********************************
4140 REM* READ IN RECORDS FOR SORT    *
4150 REM*********************************
4160 REM
4170 PRINT"[CLEAR]":PRINTTAB(32)"[UP][U
P][REV]READING FILE[OFF]"
4180 C=1:FORT=2TONR+1
4190 DATA#1,(T)
4200 INPUT#1,N$:S1$(C)=N$
4210 IFN$=CHR$(1)THENPRINTTAB(20)"RECOR
D #"I+1" EMPTY":EM=1:T=NR+1000:GOTO4240
4220 DATA#1,(T),35
4230 INPUT#1,P$:S2$(C)=P$
4240 I=I+1:C=C+1
4250 NEXTT
4260 N=0:I=0:K=0
4270 IFEMTHENPRINTTAB(16)"[DOWN][REV]CA
NNOT SORT UNTIL EMPTY RECORDS UPDATED[O
FF]"
```

To be continued on page 80

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R.L.
FRANKLIN
FIRING LINE
FROM COMM DATA

Continued from page 77

```
4280 IFEMTHENEM=0:GOTO1560
4290 REM
4300 REM*********************************
4310 REM*        SORT ALL RECORDS       *
4320 REM*********************************
4330 REM
4340 PRINTTAB(35)"[REV][DOWN]SORTING[OF
F][DOWN]"
4350 C=C-1:REM CORRECT FOR LAST TIME TH
ROUGH LOOP
4360 FORJ=1TOC-1
4370 FORK=J+1TOC
4380 IFS1$(J)<S1$(K)GOTO4420
4390 T1$=S1$(J):T2$=S2$(J):REM SAVE TWO
 TEMP STRINGS
4400 S1$(J)=S1$(K):S2$(J)=S2$(K): REM S
WITCH VALUES
4410 S1$(K)=T1$:S2$(K)=T2$: REM RESTORE
 TEMP
4420 NEXTK
4430 PRINT"-";:NEXTJ:K=0
4440 REM
4450 REM*********************************
**
4460 REM*  UPDATE SORTED LIST TO FILE
 *
4470 REM*********************************
**
4480 REM
4490 PRINT:PRINTTAB(30)"[DOWN][REV]oRIT
ING NEW FILE[OFF]"
4500 FORT=2TONR+1
4510 DATA#1,(T)
4520 PRINT#1,S1$(T-1)
4530 DATA#1,(T),35
4540 PRINT#1,S2$(T-1)
4550 NEXTT
4560 PRINTTAB(21)"[DOWN][DOWN][REV]-ECO
RDS SORTED AND WRITTEN TO FILE[OFF][DOW
N]"
4570 GOTO1560

READY.
```

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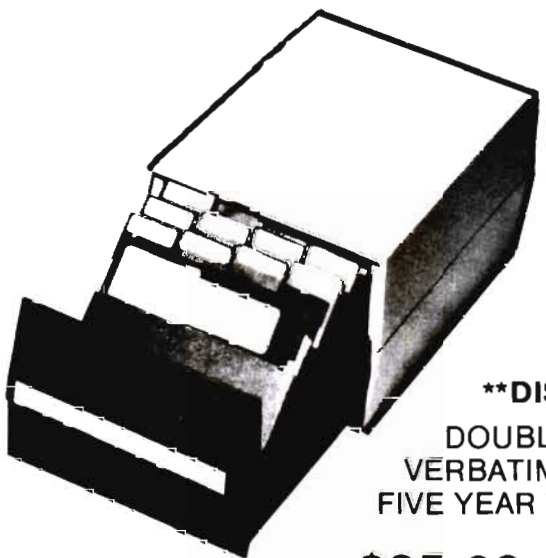

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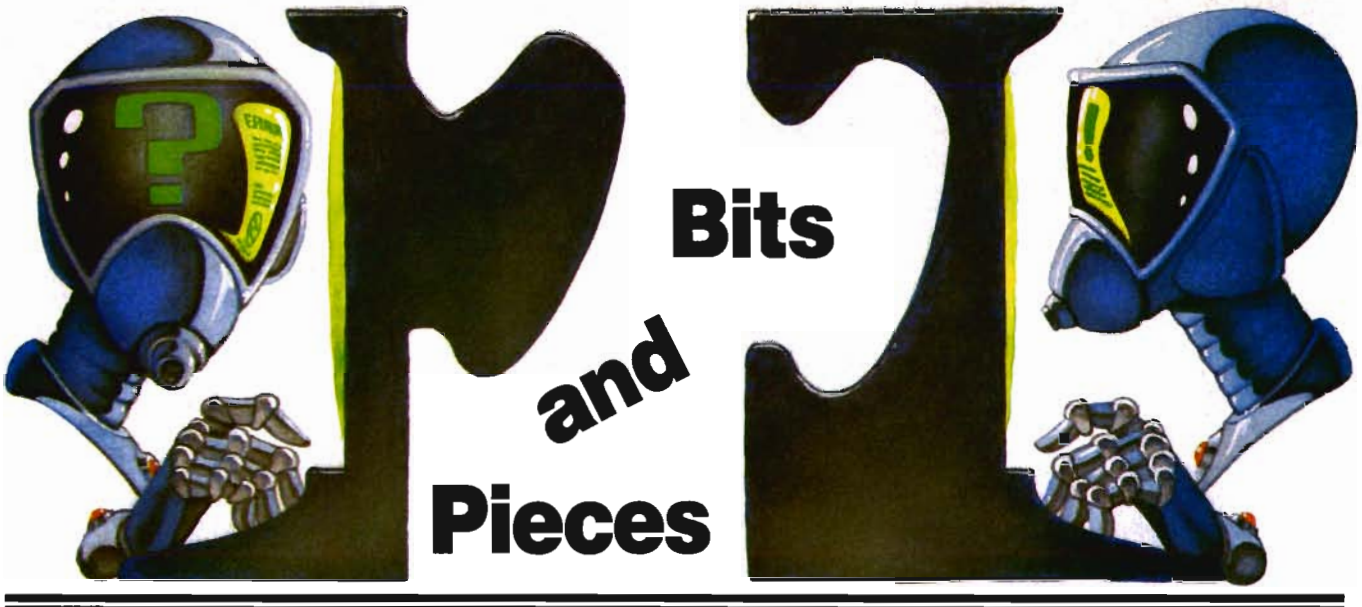

Memorial

We at **Commander** would like to dedicate our September issue to the memory of Mr. Neil Omvedt. Neil was one of our first writers on staff and made many valuable contributions to **Commander Magazine**. His experience and knowledge will be missed by many.

1541 Disk Drive

Dear Sir:

The article in your July 1983 issue (page 40) about the Commodore 1540/1541 disk drive written by R. G. Partner of Federal Way, Washington was well written and very welcome reading material for a lot of us frustrated owners. I hope that the expression of possible follow-on articles comes true.

I have been using the 1541 with my Commodore 64 constantly since the beginning of the year and am quite pleased with it.

Your readers should be aware that the Commodore 1541 User's Manual ranks as one of the worst computer technical publications I have seen. It is full of typos, errors and just plain confusion. My recommendation is that it be read for some rather good ideas but that it should be taken with a grain of salt. It starts in the beginning of the manual with the statement that one should never remove the disk when the green light is on (the power indicator), is badly written throughout and ends with contradictory descriptions of the directory header layout.

My advice is to read all of the user submitted articles you can get your hands on, starting with "So You Bought a Disk Drive!?" To save some confusion, although the article mentioned the ability to perform a directory command with only "$" or "$0", I've found that, at least with the 64, I must prefix it with the ">" or the "@". Also the article states that in loading a machine code program at its original address, one must use the LOAD "program name",8,1 command. Using "@" or " %" will perform the function nicely, e.g., %program name. While that command may be used with the DOS shorthand, I have not found an equivalent for VERIFY "program name",8.

Sincerely,
David Campbell□

White Flashes

Dear Commander,

In regards to the "white flashes" in the C-64, I found the answer to my problem in the schematic of the Programmer's Guide. After studying the video circuit, I bought a 220 pf capacitor from Radio Shack (2/39¢) and inserted it. My "white flashes" are gone forever.

Incidentally, I have one of the **latest** mother boards that has holes for one or two (future?) chips so I am sure the "white flashes" are not restricted only to older boards.

Sincerely, Toshiro Katsura□

Dear Editor,

In your June issue, two letters were published stating that my problem with white flashes on the C-64 screen should be referred back to the dealer. I did just that and was given a new C-64, pretested by the dealer in 5 days. There was no exchange fee of any sort—just sympathy and prompt handling of the problem.

My dealer was Professional Micro Service of Baltimore, MD, who also introduced me to Commander Magazine.

Thank you!
Vincent J. Mooney, Jr.

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You can get help for your Commodore VIC-20 by dialing a series of recorded voice messages at (206) 935-7032. Twenty different messages are available. Each time you hang up and redial you get a different message. In addition, the entire series is changed every week.

In addition to advice, space is available for your own personal messages on this hotline. If you have a Computer product or service to sell, mail a cassette recording of your own message to Gazaway, VIC-20 Computer Club, 7906 34th Ave. S.W., Seattle, WA 98126 and the club will try to include your message on the recorded message hotline. There is no charge for this service.□

MicroComputers: How They Will Affect Our Homes Today And In the Future

by Arthur J. Dudley

With the advent of the microprocessor, we have been thrust into a technological revolution. Within the next few years, we will witness advances in the microcomputing industry which will significantly affect not only our work environment but our lives at home. I believe computers will cause significant changes in three general areas relating to the home environment. They are 1) education, 2) data retrieval, and 3) financial transactions.

Current predictions forecast that by 1985, approximately 85% of the homeowners will own some brand of microcomputer. Using price and product quality as a basis, it seems highly probable that this prediction will come true. Prices are dropping at a staggering rate with little or no sacrifice in quality. Hardware and software companies are coming into being on a daily basis, and many are meeting with success. This demonstrates a truly competitive market; a market that will continue to grow and prosper in the years to come.

Education

Microcomputers will continue to play a major role in education, both in school and at home. Software presently on the market will make learning less tedious and more enjoyable. In addition, the teacher's needs are also the concern of software developers. Teachers will be able to purchase software packages which will assist them in areas of exam preparation, student evaluation, and curriculum development all at a touch of a few buttons.

If you have children and are wondering what to do with your Commodore computer, the answer is simple. Use it as a learning tool. For some strange and inexplicable reason, the younger generation seems to have a strong affinity for the computer. They can relate to it, they accept it, and by all means they will use it. So as a parent, here is your chance to teach your child without all the pain and anguish. One word of caution. Before you purchase educational software, gather all the information you can on the product to insure it meets your needs. This rule of thumb should be applied to all your software purchases whether for personal or business applications.

We are going to see the day when a student can take an exam, research a term paper, or attend class in the comfort of his home.

Data Retrieval

Huge integrated data bases and artificial intelligence (a process by which computers will simulate human reasoning) are around the corner. These two areas are receiving large amounts of attention from computer specialists and government officials. One reason for their interest is the realization that the Japanese are also making significant gains in the same two areas. The involvement of the Japanese and United States in computer technology further demonstrates the intense competition characteristic of the computer industry.

Integrated data bases and artificial intelligence will affect our lives in many ways. To name a few...

1) We will be able to research topics and collect data at our home in a matter of minutes. No longer will visiting the library and searching through endless card files be necessary.

2) High level programming languages based on our own English language will be available. Users will not have to learn how to program to develop custom applications; all that will be necessary is literally to tell the computer what is needed in everyday ter-

minology and the program will be created automatically.

3) We will see advanced speech understanding systems. This includes voice input, speaker identification, and speech response. The keyboard will become obsolete.

4) Applied picture and image understanding systems will be available. We will be able to store and retrieve images of three dimensional objects with a computerized system.

5) Access to an endless wealth of information such as travel information, federal and local news, weather reports, sports information, job opportunities, scientific data. . . Newspapers as we know them today will become a thing of the past.

When will all this come into play? It is happening now. There are services currently available such as CompuServe, Omnet, NewsNet, Dow Jones News/Retrieval Service. . . that allow us access to large data bases for a reasonable fee. Even as impressive as these services are, they are still in their infancy. I believe by the late 1990's we will reach a stage that accessing huge data bases will be as common place as using the telephone is today. Furthermore, as telecommunication methods improve and as computers become more common in the home, a gradual shift in the workplace will occur. Professionals will be able to perform their routine and everyday tasks at the breakfast table via their terminal. As a result, we as a society will have greater flexibility, will become more efficient, and will be able to accomplish a great deal more in our profession and daily activities.

Financial Transactions

Of all the various computer applications, this is the most controversial. Imagine a society in which all transactions are done electronically without the need for paper money and checks. To some people this is disturbing; to others, a convenience. This application is downstream a bit, not because of technology but primarily because of cost. A conversion from our present system to a computerized system will be done gradually over a period of time.

Let us take a look at some of the advantages and disadvantages of "electronic money".

Disadvantages:

1. Since all transactions will be done electronically, access to our financial affairs can be more easily obtained by individuals or organizations. Regulations will need to be established defining guidelines and restrictions, but consumers will still experience a loss of privacy from a financial perspective.

2. Sophisticated computerized fraud is extremely difficult to detect. Complex computer systems will be understood only by a few; therefore, crimes dealing with money transactions will be committed only by a few of those individuals who understand the system. The Federal Government realizes the significance of this problem and is currently taking positive steps towards its prevention.

3. Detecting and correcting transaction errors may be difficult. This is evident in our present day systems. However, with proper planning and systems design, this can be avoided.

4. Since all transactions will be recorded, we may lose more privacy than realized. You can gain large amounts of information on an individual by knowing what he/she purchases. Strict federal controls must be established on this matter.

Advantages

1. Since paper money will become obsolete and products coded, theft, robbery, and burglary will be reduced considerably.

2. Federal and local law enforcement agencies will easily be able to apprehend fugitives by gaining access to their computerized transaction records.

3. Consumers will be able to obtain loans faster and easier. Major purchases such as buying a car or home could be accomplished in a fraction of the time.

4. Sophisticated and effective financial management packages will be made available to help the consumer stay within their budget.

5. Businesses will not lose money because of bad credit, bad checks, or non payment of bills.

6. Consumers will not have to be concerned with the payment of bills—this will be done automatically.

With any newfound concept or idea, there are advantages and disadvantages. From an overall standpoint, computers do pose problems. But their ability to help with everyday tasks and make lives easier far outweigh any disadvantages. A computer is a tool, a bit complex maybe, but still a tool. As long as it is remembered that we are the controlling force, problems will be minimized and our living standards will be improved. If you have just purchased a Commodore computer, you will soon realize its applications are endless, and as a result, life a little easier.□

Intelligent Software For Commodore Computers

Copycalc is an affordable electronic spread-sheet which turns your video screen into a window on a matrix of numbers. Cursor around the matrix, enter numbers; the totals reflect the changes. You can save the matrix to disk or tape, or print it or your printer. For $20 ($15 with another program), this program might justify the cost of your computer. Requires 6k RAM; smaller version available for a standard VIC.

Word Processor Plus was not designed to be an expensive toy; it was designed solely to facilitate correspondence, for a wide range of personal and business uses, quickly and easily, with a minimum of training and frustration on the part of its user, and at the least possible cost, both in hardware and software. The most thoroughly tested, useable word processor available at anywhere near the price, $25; 10k RAM, printer req'd.; RS-232C version available for VIC and 64.

Also available: **Baseball Manager**, a sports-documentation program; and **Inventory**, a perpetual inventory control program for a small retail business (various reports, multiple vendors); $30 each; 10k RAM req'd., printer suggested.

All programs will load and run on any Commodore computer; all support tape, disk, and printer.

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Either Cartridges can be plugged into the memory expansion port of the VIC-20 or an expansion chassis. The 40 character mode may be easily viewed on most standard T.V. sets but a monitor is required for the 80 column mode to provide the necessary additional resolution.

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Introduction to Assembly Language Programming

Subroutines
Part IX

by Eric Giguere

In many ways an assembly language program may resemble a BASIC program. Probably the most prevalent is their use of subroutines. Subroutines are frequently used blocks of code set off from and called by the main code of the program. When it is finished executing it returns to the part of the program that called it. Subroutines are used to save memory and clarify the program. In BASIC a subroutine is called by the instruction GOSUB (for GOto SUBroutine) and a line number. In assembly language it is called by the instruction

JSR address

JSR stands for Jump to Subroutine and 'address' represents the memory location the subroutine starts at. Upon encountering the JSR the computer would start executing the code at 'address' until it was told to return to where it came from. In BASIC we use the statement RETURN whereas assembly language uses

RTS

or Return from Subroutine. This is basically all you need to know on how to call and return from a subroutine—just use a JSR and end the subroutine with an RTS. Let's explore some uses for subroutines.

Uses of Subroutines

When is a subroutine useful? Usually when a routine is executed more than once or twice. At this time it may be advantageous to move the routine somewhere else in memory and call it as a subroutine. For example, say you wanted to display the message "Hit any Key to Continue" on the screen and wait for the user to hit a key. If you didn't use a subroutine you might end up with a couple of hundred bytes of identical code spread throughout the program. Executing it as a subroutine saves memory and makes your program more efficient. Each time you needed the message displayed you simply use a JSR to the proper location. It sure saves a lot of hassle.

Subroutines may also call other subroutines to execute other functions. Our previous example of a message-displaying subroutine could perhaps call another subroutine to display the message and would only do the other half itself (wait for a key to be pressed). It's all up to the programmer to decide how the subroutines should work.

The KERNAL

No, we're not talking about fried chicken. The KERNAL is a table at the top of memory in all Commodore machines that accesses certain functions in the computers, mostly input/output. A JSR to any of these locations will execute that function and then return to the calling program. For example, one of the most used routines is the one at $FFD2 (65490 decimal). This routine prints the ASCII value of the accumulator to the screen at the present cursor location. This means that if the accumulator holds $41 (65) and you do a JSR $FFD2 the character 'A' will be printed to the screen, just as if you did a PRINT ASC(65) from BASIC. All of these locations are the same in every Commodore computer to provide compatibility between machines. Several of the most useful routines you can call are:

CHROUT ($FFD2)—outputs the ASCII value of the accumulator to the screen

CLOSE ($FFC3)—close a specified logical file (number of file in accumulator)

GETIN ($FFE4)—get the next character in the keyboard buffer

OPEN ($FFC0)—open a logical file

READST ($FFB7)—read the status variable ST

STOP ($FFE1)—check to see if STOP key is pressed

There are a whole bunch more routines but these require detailed explanations (check the VIC-20 or C64 Programmer's Reference Guide). The routines given above are the most common.

Examples of Subroutines

Let's say we wanted to keep a numeric counter of some kind in memory—we won't define any specific use for it. We could code it as such:

```
INCR    INC COUNTR
        BNE EXIT
INCRHI  INC COUNTR+1
EXIT    RTS
```

In this subroutine COUNTR is the low byte of the counter and COUNTR+1 is the high byte. A JSR to INCR would increase the low byte by one. It would then check to see if the byte has rolled over to zero. If it isn't zero yet it simply branches to the RTS which returns the computer to the main program. But if COUNTR has rolled over this means that we should also add one to the high byte, lest our counter be inaccurate. The INC COUNTR+1 accomplishes this. It then returns to the calling program. Nothing spectacular about this code, but it does the job.

You've probably noticed the three labels in our example. INCR is the entry point of the subroutine and EXIT indicates the exit point. But what is INCRHI there for? Suppose we suddenly wanted to increase our counter by 256. We could call INCR 256 times OR we could simply call INCRHI instead of INCR. INCRHI would automatically increment the high byte by one and return. Each increment of the high byte adds 256 to the whole counter (remember our discussions about high and low bytes?). This shows us that a subroutine does not need to be called from its beginning. You can jump only to whatever part of the subroutine you need.

Another example would be a subroutine to print out a message. How would you accomplish this? Try and figure out a way, then examine the following example:

```
PRMESG LDX #0
NEXT LDA MESSGE,X
BEQ EXIT
PRINT JSR CHROUT
  ;CHROUT = $FFD2
INX
JMP NEXT
EXIT RTS
;
MESSGE ACS 'HIT ANY KEY
  TO CONTINUE'
BYT 0
```

This example might seem a trifle complicated but it does work. PRMESG is the start of the subroutine and here we initialize the X-register by loading it with zero. NEXT gets the next character from location MESSGE plus the X-register. If the character is zero the subroutine returns via EXIT. Otherwise the character is sent to CHROUT which prints it to the screen. After returning from this subroutine we increment the X-register to point it to the next character and JuMP (go) to NEXT to continue until we reach a zero. This routine shows some of the advantages of using the KERNAL table at the top of memory. Again, another useful application for a subroutine.

The Stack

Remember back in February when we talked about registers and I mentioned something called the stack? I skimmed the subject because it was over our heads, unnecessary at the time. But in reality it is a very useful part of the computer. Think about this: how does the computer know where to return to after executing a subroutine and encountering an RTS? That information has to be kept somewhere. This is what the stack is for. It serves as a temporary storage area for the computer. It is always located on page 1 ($0100-$01FF) of memory, so never place any data here unless you're absolutely sure of what you are doing, because you could mess things up pretty badly.

The stack pointer is a register used by the computer to point to the next free memory location on the stack. Strangely enough, the stack starts at $01FF and goes down to $0100. This means that any data placed on the stack is placed beginning at the top of page 1 and going down. For this reason incrementing the stack pointer decreases the amount of information on the stack (see figure 1). Decrementing the pointer actually adds to the data already on the stack. This is a fact you cannot forget when dealing with the stack.

To know where to return after a JSR statement the computer uses the stack in this way: it places its present location in memory plus 2 (to point to the next instruction following the JSR) onto the stack and then jumps to the subroutine. Upon hitting an RTS it takes the location back off the stack and starts execution from there. It's not too complicated when you think about it.

PHA and PLA

Remember I said the stack was a temporary storage area. We can place and retrieve information on it in the same manner the JSR/RTS pair does. The two instructions to accomplish this are PHA (Push Accumulator onto stack) and PLA (Pull contents of Accumulator from stack). PHA will place the current value of the accumulator onto the next available stack location. PLA does the opposite, retrieving that value and placing it back into the accumulator. These instructions are needed only when you have to store data temporarily. But care must be taken when using them. If you don't push or pull the correct amount of bytes off the stack you could cause havoc when the computer encounters an RTS. Example:

```
SUBRTN  PHA
        PHA
        . . .
        . . .
        PLA
        RTS
```

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RTS

If you call SUBRTN via a JSR it will execute normally but the RTS won't jump back to the proper location in memory. Why? Because we did two PHA's but in the end we only did one PLA. When the RTS is encountered the computer will first see your value and then the high byte of the correct location, effectively sending it where it shouldn't go. Caution is needed here.

PHP and PLP

These two instructions are identical to PHA and PLA except that they push or pull the Status Register onto the stack. Caution should again be used with these.

Next Month

Next month we're taking a look at the masking instructions—AND, EOR and ORA. Until then have fun applying what you learned today in your own programs.□

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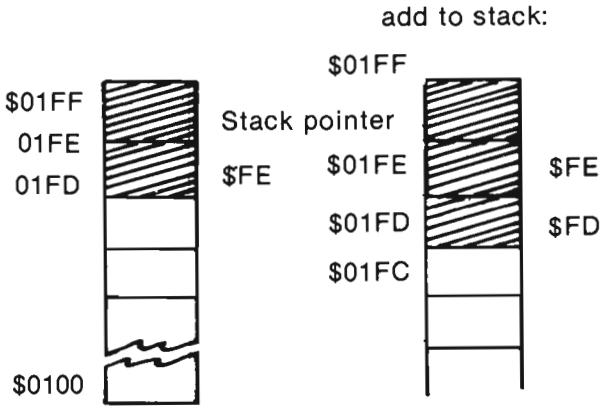
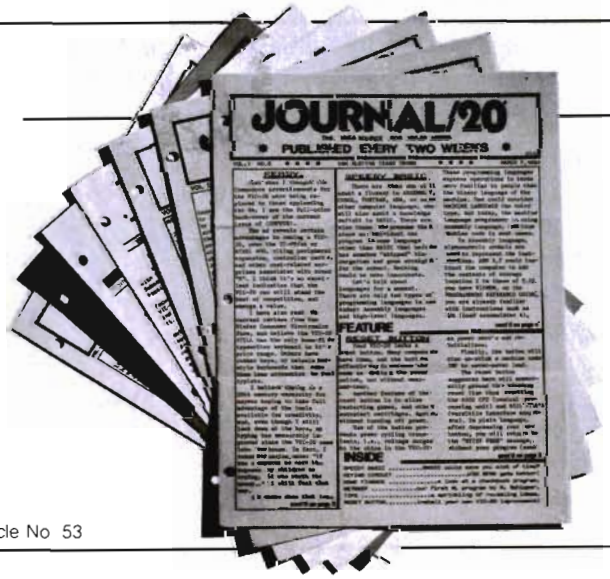
Figure 1: The Stack



taking from stack is
the exact opposite



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Circle No 12

The Vic Clock

by Arthur J. Dudley

VIC with use of 3K Super Expander by COMMODORE

The listed program will demonstrate some of the strengths and weaknesses of the Super Expander cartridge and at the same time help teach first and second graders how to tell time. If you do not have a Super Expander cartridge and are interested in running this program, try borrowing one from a friend. It may prove worthwhile.

Instructions

The first display you will see after entering RUN is a user menu. Below is a breakdown of each section:

-1- SELECT The clock will indicate any time you input as long as it is an increment of five (i.e. 1:05, 12:05, 10:15, 3:45...). Times such as 1:03, 3:42, 12:06, etc., cannot be entered. After the entry is made, there is no need to hit RETURN; however, each entry must be four characters long. If the time consists of three digits, the first must be a **SPACE**. For example: To enter 1:15, press **SPACE, 1, 1,** and **5** (Do not enter the colon). After you have made your entries the correct time will be displayed in the upper right hand corner of the screen.

-2- BY 5 Each time the SPACE BAR is pressed the clock will increment by five minutes. If the SPACE BAR is held down, the hands will continue to rotate until the SPACE BAR is released.

DRILLS Times will be selected at random and displayed on the clock face. The operator will then enter the time he feels is displayed on the clock in the same fashion as in section one. If the entered time is correct, an alarm will sound with the entered time displayed in the upper right hand corner. A new problem will then be displayed. If the entered time is incorrect, a buzzer will sound. You have one more chance to answer correctly before the correct time is displayed in digital format. Even after the correct time is displayed, it must be entered via keyboard for the program to continue. The four problem sections are as follows:

-3- HR Times displayed will be based on the hour (i.e. 1:00, 3:00, 12:00, 4:00...)

-4- ½HR Times displayed will be based on the half-hour (i.e. 1:00, 3:30, 4:00, 5:30...)

-5- 1/4 HR Times displayed will be based on the quarter-hour (i.e. 1:00, 2:45, 3:15, 5:30...)

-6- 5 MIN Times displayed will be based on 1/12th of an hour (i.e. 1:00, 4:50, 12:05, 4:35, 6:30, 7:25...)

-7- END This will end the program.

Notes

1. To enter a section, enter the appropriate SECTION NUMBER and press RETURN.
2. To exit a section and return to the menu, press an **X** (no need to hit return).
3. When exiting a problem section, the number of problems answered correctly and incorrectly will be displayed prior to returning to the menu.
4. All entered times must be four characters long and be increments of five. If this format is not followed the program will not accept your entry.
5. The dot below the digital time in the upper right hand corner is a place keeper. Since you cannot see your entered time until after all four characters are entered, this is a handy way of keeping track of where you are.

The following is a guide you may follow to teach your child to tell time. Remember, progress to higher levels only after the child becomes proficient at the current level.

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Jumpman (D) ... $27
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Fast Eddie (D) ... $23
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Data Master (C/D) ... $21
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Label 2.6 ... (C) $15 (D) $17
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Time Manager 2.6 (D) .. $27
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Resrch Assist. 2.0 (D) .. $27
UMI
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Renaissance (C) ... $27
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Trek (C/D) ... $13
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Adv. Pack #2 (C/D) ... $16
Grave Robbers (C/D) .. $13
Chomper Man (C/D) .. $18

Circle No. 49

1. Show the different hours on the clock face and guide your child through by explaining the functions of the long and short hand. This is a good time to explain clockwise. Use **section 1** when explaining the above concepts and **section 2** to demonstrate how the small hand moves in relation to the big hand. Allow your child to practice in **section 3**.

2. Utilizing **section 2**, count by fives from 12 to 6. Do this as many times as necessary until the child can do this on his/her own. Explain to your child that each number on the clock face represents five minutes.

3. Explain to your child the meaning of half-past. Show examples using **section 1**. Allow your child to practice in **section 4**.

4. Using **section 2**, count by fives from 12 to 3, from 3 to 6, from 6 to 9, and from 9 to 12. Again do this as many times as necessary until the child can do this on his own.

5. Explain the meaning of quarter-past and quarter-to using **section 1**. Allow your child to practice in **section 5**.

6. Count by fives from 12 back to 12 using **section 2**. Insure the child understands each number on the clock face represents five minutes. Provide examples of different times using **section 1**. Allow your child to practice in **section 6**.

Note: It will be beneficial at times to review sections already accomplished.

A big advantage of the Super Expander cartridge is it provides users with additional instructions devoted to graphics. Without the Super Expander, one can still work with graphics using CBM BASIC or machine language. But CBM BASIC when applied to graphics is cumbersome and slow; machine language, which is by far more efficient, is difficult to use. The Super Expander is a good compromise. It will not provide the smooth animation of machine language but is much

```
 1 POKE36879,60:AC=0:W=0
2 PRINT"[CLEAR][BLACK]-1- SELECT":PRINT
"-2- BY 5"
5 PRINT"PROBLEMS"
7 PRINT"-3- HR":PRINT"-4- 1/2 HR":PRINT
"-5- 1/4 HR":PRINT"-6- 5 MIN":PRINT
8 PRINT"-7- END":MM=00:H=12:INPUTCH$:IF
CH$<"1"ORCH$>"7"THEN2
9 IFCH$="7"THEN9999
20 GRAPHIC2:COLOR3,4,0,4
30 CIRCLE1,511,511,400,500
40 CHAR1,9,"12":CHAR3,13,"1":CHAR6,15,"
2":CHAR10,16,"3":CHAR14,15,"4":CHAR17,1
3,"5"
100 CHAR18,10,"6":CHAR17,6,"7":CHAR14,4
,"8":CHAR10,3,"9":CHAR6,3,"10":CHAR3,5,
"11"
155 A=1:X=511:Y=160:X1=X:Y1=Y
160 GOSUB1000
165 A=1:X=511:Y=300 :X2=X:Y2=Y
170 GOSUB2000:CHAR0,15,"12:00":IFCH$>"2
"THEN:CHAR0,15,"XX:XX"
171 IFCH$="2"THENGOSUB7000:GOTO182
172 IFCH$>"2"THENGOSUB8000:GOTO185
173 CHAR1,15,".      ":GETH1$:IFH1$=""TH
EN173
174 IFH1$="X"THEN9930
175 CHAR1,15," .    ":GETH2$:IFH2$=""THE
N175
176 CHAR1,15,"    . "
177 GETM1$:IFM1$=""THEN176
178 CHAR1,15,"     ."
179 GETM2$:IFM2$=""THEN178
181 H$=H1$+H2$:M$=M1$+M2$:H=VAL(H$):M=V
AL(M$)
182 IFCH$>"2"ANDF=0THENGOSUB6000
183 IFCH$>"2"AND(HR$=H$ANDMR$=M$)THENGO
TO9500
184 IFCH$>"2"AND(HR$<>H$ORMR$<>M$)THENG
OTO9700
185 D=INT(M/5)*30:IFCH$<"3"AND(H>12ORH<
1)THEN9700
186 IFCH$<"3"AND(M/5<>INT(M/5)ORM>55)TH
EN9700
187 IFCH$<"3"THENGOSUB6000
190 A=0:X=X1:Y=Y1:GOSUB1000
200 C=351:GOSUB3000:GOSUB1000:X1=X:Y1=Y
:D=H*30+M/60*30:A=0:X=X2:Y=Y2:GOSUB2000
230 C=211:GOSUB3000:GOSUB2000:X2=X:Y2=Y
:X=X1:Y=Y1:GOSUB1000
390 IFCH$>"2"ANDF=1THENF=0:GOTO173
400 GOTO171
999 END
1000 DRAW.A,511,511TOX,Y:DRAWA,500,511T
OX-10,Y:RETURN
2000 DRAWA,511,511TOX,Y:DRAWA,511,511TO
X,Y:RETURN
3000 A=1:IFD<=90THEN3080
3040 IFD<=90THEN3080
3050 IFD<=180THEND=180-D:GOTO3120
3060 IFD<=270THEND=D-180:GOTO3160
3070 IFD<=360THEND=360-D:GOTO3200
3080 GOSUB4000
3090 GOSUB5000:RETURN
```

To be continued on page 96

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CRICKET - From the company that brought you Asteroidz, Munchman and a host of other blockbusters. We now present CRICKET. This is a challenging game with a cast of characters you will love and hate. All you have to do is get Cherp from one side of the road to the river and then across the river. Not so fast though. First you have to figure out how to dodge the traffic and get to the center. Then how are you going to get across the river? Look here comes a log — even a turtle. Hitch a ride across the river and jump from one to the other. Keep a sharp eye out for Ade the Gator. He loves to have crickets for lunch. How many times can you get across the road and river. You will have to work as fast as you can. Time limit and bonus. You will find this game addictive and challenging and it will entertain you with hours of fun and enjoyment. **$14.95**

PARATROOPER

BUG BLAST - If you think Centipede was fun — look out for BUG BLAST. A new and fast action arcade game with realistic smooth action, quality hi-res graphics and trouble. Its very calm as the first wave attacks. Only a few bugs to kill. Just shoot thru the cactus and wipe them out. After a few attacks you feel you have everything under control. Now the attacks really start. Those protection areas have to go. Blast away. Will they ever stop? OK — the BUGS got me this time. Now its my turn, Just one more time — BUG BLAST — Now its your turn to get even. **$14.95**

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MOW

MOW - Get ready for the fast and furious action of the craziest mower you have ever seen. How much grass can you cut? Joystick moves your mower around as fast as you dare. Watch out for granny's dafodils and grandpa's radio antenna. **$14.95**

COSMIC CRUZER - Bring the coin-op game into your VIC. 3 Scenarios. Your Cruzer moves over a mountainous landscape & into a tunnel of surface - to - air missle, silos and ground - to - air weapons. If you can make it in and out of the tunnel you fly into the asteroid field. Drop bombs and fire missiles at the fuel dumps to keep your fuel supply up. If you are really good you can get to the base and try, to destroy it. We don't know of any one that has hit the base yet. Maybe you will be the 1st. Cosmic Cruzer is a fun filled magnificently rendered home video game that will last for months of challenge. Highly addicting. Hi-Res Graphics, Color & Sound. **SPECIAL PRICE - $14.95**

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SPACE PAK - Can you survive? 3 space games with the sights and sounds of arcade games. The excitement builds as the action is un-ending. Blast away at everything in sight. The alien attacks will stop at nothing to destroy you. Prepare for battle, there is no escape, unless you can help. Can you survive? Hi-Res, Color, Graphic & Sound. Joystick or keyboard. **$19.95**

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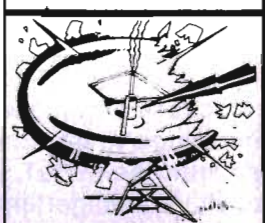
TARGET COMMAND - The whole West Coast is being bombarded and only you can save it. You are at the controls of the missile launcher and hold the destiny of our country in your hands. It takes a cool head, not hand and fast reflexes to zap those missiles right out of the air. Get ready to pulverize — atomize and vaporize them. Oh, my God, those warheads are heading right for our ammo dumps. They are everywhere. NO ONE CAN SAVE US — EXCEPT YOU. You must move your laser into position and fire as fast as you dare. Time limit with arcade style excitement. Protect your ammo at all costs. 10 levels of play. **$14.95**

SNAKEOUT - Slip your snake into position and score by chomping the blocks. Watch the way you slither because your escape routes get smaller. 2 Bonus games included. **$14.95**

HEAD-ON - Please do not buy this game if you are the type that says "I'll play it just one more time". Players have been known to start playing HEAD ON at 8:30 p.m. and at 2 a.m., wonder where the time went? Have you ever tried to explain to someone why you played a game for five and a half hours. We know of no remedy for the addiction to HEAD ON except to beat the VIC on level 9. No one has done it, YET, will you? We think not. Move your car as fast as you can dare around the tracks. You get 3 cars and MUST avoid the computer car. Points for the most dots covered. Bonus cars, nine levels of play. **$14.95**

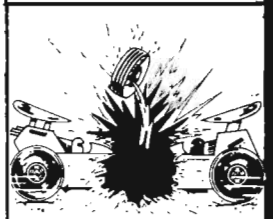
BUG BLAST



TARGET COMMAND

COSMIC CRUZER

SPACE PAK



HEAD ON

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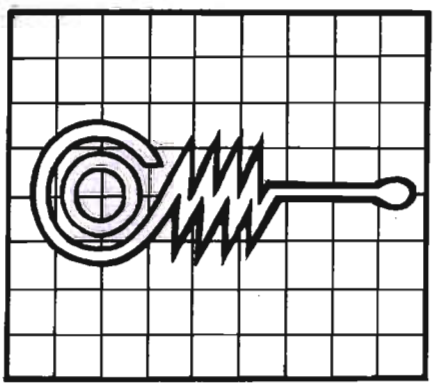
faster and requires fewer instructions for graphic representations than CBM BASIC. Try the circle program listed in your programmer's reference manual and compare it to the CIRCLE instruction used by the Super Expander to see what I mean.

Some disadvantages of the Super Expander are you cannot print string or numeric variables when in the graphics mode. However, string constants can be displayed in the high resolution mode only. This is why lines 6000 to 6900 are structured the way they are. Using the INPUT statement while in the graphics mode can cause strange and inconsistent things to happen. After working with the INPUT statement for a while and getting nowhere, I finally reverted to using the GET statement. This explains why you must enter four characters when inputting time. If anybody has successfully used the INPUT statement in the graphics mode, please write and tell me how you did it.

Even with the disadvantages I mentioned, the ease with which one can create graphic displays and the additional 3K of memory more than justifies having one. If you have any comments on this program or suggestions for future articles, do not hesitate to write. I will be glad to hear from you.

Address all correspondence to: Art Dudley, c/o Commander, P.O. Box 98827, Tacoma, WA 98498.

If you desire a copy of the listed program, please send me a **blank** cassette and $2.00 to cover shipping and duplicating.□



Continued from page 94

```
3120 GOSUB4000:YY=YY*-1
3130 GOSUB5000:RETURN
3160 GOSUB4000:YY=YY*-1:XX=XX*-1
3170 GOSUB5000:RETURN
3200 GOSUB4000:XX=XX*-1
3210 GOSUB5000:RETURN
4000 XX=(SIN(D/57.3)*C)/1.3
4010 YY=COS(D/57.3)*C
4020 RETURN
5000 X=511+XX
5010 Y=511-YY:RETURN
6000 REM
6001 IFMID$(H$,1,1)="0"ANDCH$<"3"THEN17
1
6003 IFH$="12"THEN:CHAR0,15,"12"
6010 IFH$=" 1"THEN:CHAR0,15," 1"
6020 IFH$=" 2"THEN:CHAR0,15," 2"
6030 IFH$=" 3"THEN:CHAR0,15," 3"
6040 IFH$=" 4"THEN:CHAR0,15," 4"
6050 IFH$=" 5"THEN:CHAR0,15," 5"
6060 IFH$=" 6"THEN:CHAR0,15," 6"
6070 IFH$=" 7"THEN:CHAR0,15," 7"
6080 IFH$=" 8"THEN:CHAR0,15," 8"
6090 IFH$=" 9"THEN:CHAR0,15," 9"
6100 IFH$="10"THEN:CHAR0,15,"10"
6110 IFH$="11"THEN:CHAR0,15,"11"
6200 IFM$="00"THEN:CHAR0,18,"00"
6205 IFM$="05"THEN:CHAR0,18,"05"
6210 IFM$="10"THEN:CHAR0,18,"10"
6215 IFM$="15"THEN:CHAR0,18,"15"
6220 IFM$="20"THEN:CHAR0,18,"20"
6225 IFM$="25"THEN:CHAR0,18,"25"
6230 IFM$="30"THEN:CHAR0,18,"30"
6235 IFM$="35"THEN:CHAR0,18,"35"
6240 IFM$="40"THEN:CHAR0,18,"40"
6245 IFM$="45"THEN:CHAR0,18,"45"
6250 IFM$="50"THEN:CHAR0,18,"50"
6255 IFM$="55"THEN:CHAR0,18,"55"
6800 CHAR0,17,":"
6900 RETURN
7000 GETXX$:IFXX$=""THEN7000
7001 IFXX$="X"THEN9930
7002 M=M+5:IFM>55THENM=0:GOTO7030
7010 GOTO7038
7030 IFH=12THENH=1:GOTO7038
7035 IFH<12THENH=H+1
7038 GOSUB9000
7050 RETURN
8000 H=INT(RND(1)*13)
8010 M=INT(RND(1)*12)*5
8011 IFH=0THENGOTO8000
8012 IFCH$="3"THENM=00
8013 IFCH$="4"THENM=INT(M/30)*30
8015 IFCH$="5"THENM=INT(M/15)*15
8020 GOSUB9000
8030 HR$=H$:MR$=M$:F=1
8100 RETURN
9000 M$=MID$(STR$(M),2,2):IFLEN(M$)=1TH
ENM$="0"+M$
9010 H$=MID$(STR$(H),2,2):IFLEN(H$)=1TH
```

Continued from page 94

```
ENH$=" "+H$
9020 RETURN
9040 END
9500 POKE36878,15:FORL=1TO15:FORM=1TO30
:POKE36876,215:FORN=1TO15:NEXTN
9505 POKE36876,0:NEXTM
9510 GOTO0,15,"XX:XX":AC=AC+1
9512 GOTO172
9700 POKE36878,15:POKE36874,165:FORJ=1T
O450:NEXT:POKE36868,0:POKE36874,0
9710 W=W+1:W1=W1+1:IFW1>1THENH$=HR$:M$=
MR$:GOSUB6000:W1=0
9720 GOTO173
9930 FOR0:IFCH$>"2"THENPRINTAC;" RIGHT"
:PRINTW;" WRONG":FORJJ=1TO1000:NEXTJJ
9940 RUN
9999 PRINT"[CLEAR]":POKE36879,27
```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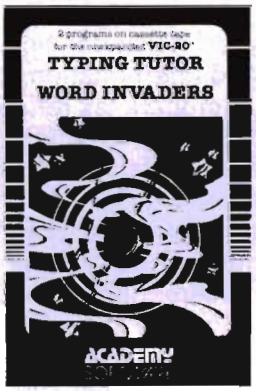

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Circle No. 2

Programmers: Write to our New Program Manager concerning any exceptional VIC 20™ or Commodore 64™ game or other program you have developed.

Getting Down to Business With the Business Man

Part One

by Kirk G. Anderson

My first experience with business came with the lemonade stand and continued on through my college days when I found myself holding, instead of a pitcher of lemonade, a degree in business administration. Needless to say, it was good to get away from the old lemonade outfit and into something more stable. After a few years as a professional managerial type, and having acquired a personal computer, I started noticing the business programs for personal computers are a desirable product for more than just business organizations and MBA's. Everyone wants to be more profitable. Whether it's an organization or an individual, improving one's financial security and position is just plain smart. The only problems for many seem to be "how do I get the expertise to answer my financial questions and where do I find the time?". Not everyone cares to know how answers to certain financial questions are arrived at, but only how to put the answers to work in order to become more profitable. This is where the personal computer is revolutionalizing the way individuals and organizations are viewing and performing accounting functions. More people are now realizing that personal computers can bring to their fingertips the services of a myriad of accounting clerks and financial analysts diligently recording and formating information for accurate analysis and interpretation. When the time to prepare tax returns arrives, some of the more fortunate personal computer users need only spend a half hour or so with their computers and the dirty work is done. But even the less fortunate users have an opportunity to increase the efficiency and accuracy of their bookkeeping and gain a much more intimate understanding of how to manipulate their finances.

Beginning to emerge into the software marketplace are a notably diversified array of business related program packages. Some of these are quite impressive, performing a number of valuable analytical functions and offering bookkeeping systems as an integral part of the program. A definite advantage for any organization is the business application software for the Commodore 64 which is beginning to become more available and relatively inexpensive. Compared to outlays you would be facing for some of the more expensive personal computer systems you simply cannot afford to overlook the amazing things that can be done with a Commodore 64. If you're an individual user like me you probably wouldn't mind having a high quality business oriented accounting system at your disposal. This being the case, you should be prepared to pay much more than the going rate for the home accounting packages that are presently on the shelf. Both individuals and organizations should consider that even if you purchase some of the top line business accounting programs you are still paying far less than someone who has the more expensive, personal computer, and getting just as much (if not more) in capability. If you own a Commodore 64 or VIC 20 you have the most affordable and yet one of the most powerful personal computers on the market today. If you find it difficult locating business software for your Commodore that satisfies your palate, just hang tight. There's plenty about to come your way and this portion of Com-

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mander will be dedicated to informing you of these new programs, as well as some older ones, and their potential uses.

One company that is working hard at developing business applications software is Southern Solutions located in McKinney, Texas (address and telephone are noted at the end of this article). Southern Solutions has developed a program we'll be looking at entitled The Business Man™, written by Chuck Stuart of Southern Solutions. The program retails for $99.95. In a nutshell, the program is a general ledger recordkeeping system and does a good job at what it's designed to do. It's menu driven and totally self-contained. If you are looking for a general ledger accounting system for your 64 you may find The Business Man™ relatively flexible and "user-friendly" (to use an old phrase). The program does have a budgeting capability that impressed me due to its flexibility and simplicity. It provides you monthly, quarterly, or year to date options for reporting and comparison for all financial statements, and prints individually formated reports. Without jumping rudely ahead in our review of the program, I think I can safely wrap up our nutshell preview by saying that the program is a quality product, probably not the best on the market, but presumably better than a good portion of it. If you want to use a real live accounting system for your personal finances and would like to know how, stay tuned because that's what this first article is going to address. If you're an individual looking for a slick way to computerize your bookwork, or, simply looking for an analytical tool to aid in financial decisions, I don't think the program would interest you. However, if you're an organization or an individual that desires a high quality format for accounting information and wishes to use, or learn to use, a general ledger recordkeeping system, then you may do well to consider The Business Man™.

Getting Started

The Business Man™ is an accounting program designed for use on the Commodore 64 with a variety of peripheral equipment. The program is an actual general ledger bookkeeping system, but does not allow designation or use of individual subsidiary ledgers as one may have in manual general ledger systems. Before proceeding I should mention that The Business Man™ does assume a working knowledge of some basic accounting principles. For those of you with little or no accounting background, or, if you have little or no experience with computers, please don't panic. If I can learn these basics then so can you. Besides, I am not going to use exotic terminology or address important concepts unless somewhere in the article I plan on explaining them to you. As previously mentioned, this is the first article of two that will be devoted to reviewing The Business Man™ by Southern Solutions. In this first article we are going to spend some time becoming a little familiar with some of the basic accounting rules, terminology, and concepts that are necessary and/or helpful for us to better evaluate and use The Business Man™. For those of you already familiar with accounting methods, and using a general ledger system, you may wish to lightly breeze over this month's article as a refresher before we explore The Business Man™ more fully in next month's issue. For those of you who would like to have just a small peek at what can be done using a general ledger system, please, read on.

Accounting 101

A general ledger system of recordkeeping, or bookkeeping, is a means whereby your financial data is input and handled within a series of journals and ledgers that accumulate related information on transactions. The process of inputting transaction related data is called "journalizing" or "posting". This posted or recorded information is then classified into specified categories or groupings and then summarized in financial reports. This entire series of operations is what is known as the Accounting Process. In other words, the whole purpose of any and all accounting system(s) is to perform the following three basic functions or steps.

1). Recording information
2). Classifying information
3). Summarizing information

These three steps are all part of creating accounting information which can then be used to better understand your financial position. Once you have a better picture of your financial position and structure, more profitable decisions concerning where to use the money you've earned can be confidently made.

Defining Some Terms

For us to proceed in any meaningful and expeditious fashion we need at this time to consider some new terms. Some of them I'm certain you may have heard before, but as related to accounting you may well find the term has a whole different meaning. Therefore, it may well be best to assimilate information just as if you've never heard the term before. This helps prevent any headaches over wondering why the accounting definition of a certain term may differ from that of some other discipline, or for that matter, even common sense.

An ASSET is defined as an economic resource that has value and is owned by an individual, a business, or some form of organization, whereby, the asset is expected to contribute to and benefit future and/or present operations. The first most logical example of an asset is cash. Whether in a savings account, checking account, stocks or other marketable securities it rep-

resents what is often called the most "liquid" asset. The concept of liquidity is very important in that assets are classified in order of liquidity. To illustrate briefly, cash in your savings account is fairly liquid because all you must do to obtain the usable cash is go into your bank and ask for the funds in your account. Depending on the proximity of your bank (which also affects liquidity) you can typically have your cash immediately, or at least at the end of the same business day in which you requested the funds. Now, compare this to attempting to cash in your automobile which has a blue book value of, let's say $6000.00. Typically, unless you wanted to take less than your established base value (blue book) it would take you much longer to convert your automobile into cash available for your use. Both the automobile and the money in your savings account are assets, but the savings account is a far more liquid asset than the automobile. For this reason, the cash in the savings account would be called a "current asset". A current asset is an asset that can be converted into cash ready for use within a relatively short period of time without disrupting normal operations. In most accounting operation that segregate current assets from other assets, the period of time designated for this conversion into cash is dependent upon what is called "the operating cycle" of the organization. The operating cycle is simply the average (mean) amount of time between the acquisition of goods, or merchandise, and the transformation of these goods back into cash. An operating cycle is often a basis for determining efficiency in the use of funds. As an individual you may not actually go out and purchase goods for resale, per se', but you do purchase dollars with your time. Your "operating cycle" may well be defined as the average amount of time for you to convert those earned dollars into income generating dollars and back into earned dollars as a return on your initial investment. The process that you may designate to achieve that return and generate your operating cycle could well be defined as your cycle of "normal operations".

Moving Right Along

Now we have an example of a framework within which to identify those of your assets that would qualify as current assets. Other assets might be insurance policies, retirement and pension plans, real property such as your house or any rental property, and maybe even accounts receivable. For an organization that extends loans and credit on merchandise purchased, or has outstanding invoices that are unpaid, accounts receivable represents a somewhat liquid asset; often times classified as a current asset. For an individual the same

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may be true. If you had a rental house and your tenant was two months behind in paying the rent, you would show an accounts receivable for the amount in arrears. The accounts receivable for an individual, though, would be considered somewhat less liquid than those of an organization due to the ability of organizations to take their "high quality" receivables to a bank and either sell them to the bank (which is called "factoring") or putting them up as collateral for a loan. An individual can rarely claim receivables of high enough quality to use these options. (By the way, "high quality" receivables are those that have a very good chance of actually being paid back in full.)

The next category that we are going to take a brief look at contains what are called "LIABILITIES". These are plainly the debts of an organization or an individual. These debts, or obligations, are classified in much the same fashion as the assets we just discussed. The important thing to remember about a liability is it is a claim, held by the person to whom you owe money, who is called a "creditor", against the assets that you hold. A creditor may have a claim not only against the asset you owe them money on (such as your car), but against all your assets, if need be, in order to satisfy an amount you may owe to them plus any fees they had to incur in collecting it.

Liabilities are also classified into current and noncurrent categories. A current liability is a debt that must be paid usually within one (1) year or the operating cycle, whichever is longer. Obligations that are of a longer term than current liabilities are often called "long term liabilities". An example of a current liability for an individual would be a gas company credit card billing. These obligations are usually required to be paid in full each month or you incur substantial service charges and fees. If you continually fail to pay the balance upon demand the company may well decide against granting you credit and take away your ability to use the credit card. A current liability for an organization might be something called "accounts payable". Accounts payable are usually short term or current debt obligations that the company has incurred by purchasing goods or services on credit. The unique thing about corporate accounts payable is that the credit extended on the purchase usually bears no interest charges or fees. This is sometimes liberally referred to as "trade credit". This type of credit is often negotiated and it is important to pay the obligation in a timely fashion. If an organization loses its trade credit then it becomes extremely difficult to purchase needed goods and services any other way except "cash over the counter". This can be tremendously cumbersome and one usually will find that organizations jealously guard their access to trade credit.

Examples of long term liabilities for an organization would be called "notes payable". These are different from accounts payable in that this is not just extended credit against purchases but a formal arrangement to use a given amount of borrowed funds for a specified period of time which is usually greater than one year. A note payable is often represented by a formal written promise to pay and includes a fee, paid by the organization borrowing the funds, called interest. An example of an individual's long term liability would be the mortgage on your house or the loan on your automobile.

Equity Funds

The last basic category of accounting information is called "Equity". Equity is the guts of any operation because it represents the available resources that have been invested by the principals (or owners) of the organization. A company has a couple of ways in which to raise funds, or capital, for planned operations. It could borrow the funds, using debt (notes payable). It could accumulate reserves from operations (this would usually take too much time to rely upon fully). Or, it could sell shares of ownership interest in the company to the public. This is called a stock issue and is the most common way that American business raises capital. For an organization this paid-in capital received from the sale of stock becomes the equity share of the business. The more stock you own in a company the more of its assets you own. But, your claim to those assets, should anything go wrong, is not before the claims of the creditors of the organization. You would be entitled to whatever was left after the claims of creditors were satisfied. This is why you find investors always watching the debt

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composition of the firms they hold stock in. Too much debt is unstable and erodes the claims of stockholders against the assets that their invested dollars helped purchase. For an individual, equity would represent the amount of any asset that you hold that is actually "owned" or financed by you personally. For example, you purchase a house, and let's assume that the total purchase price is $100,000. You have been saving for this day for quite some time and have $30,000 in cash to give the seller. You talk to your banker friend who agrees to loan you the remaining $70,000 at a 12% annual interest rate for 30 years. You close the deal and go home to post the transaction on your computerized bookkeeping system. The $30,000 cash you paid to the seller represents your "equity" while the $70,000 represents your "liability" which is a long term note payable. The house you just purchased represents a $100,000 asset. The interrelationship of these factors is expressed in a very short cardinal rule of accounting: EQUITY = TOTAL ASSETS – TOTAL LIABILITIES. Thus, in the preceeding example, the equation would be represented as such:

$30,000 (equity) = $100,000 (asset) – $70,000 (liability)

The following equation illustrates the summarization of these three accounting classifications into a single accounting report called a balance sheet. It's called a balance sheet because the accounting equation of EQUITY = TOTAL ASSETS – TOTAL LIABILITIES must always be true. If it isn't then the books are out of balance and there is an error somewhere. Before we take a look at a balance sheet we need to touch on one more concept. The definition and difference between DEBIT and CREDIT.

Learning Left and Right

Those in the accounting world have thought of new names for left and right. I suppose the first accountants thought the words "right" and "left" seemed a bit simplistic so they called left "debit" and right "credit". So began the horrors of many an accounting student.

Actually, if you remember debit and credit represent left and right, you should have no trouble understanding how to post to the different journals and accounts in a general ledger accounting system.

Putting It All Together

Now let's see if we can record something in a general ledger system. Each basic classification of accounts, asset, liability, and equity, has either a debit or a

Figure 1

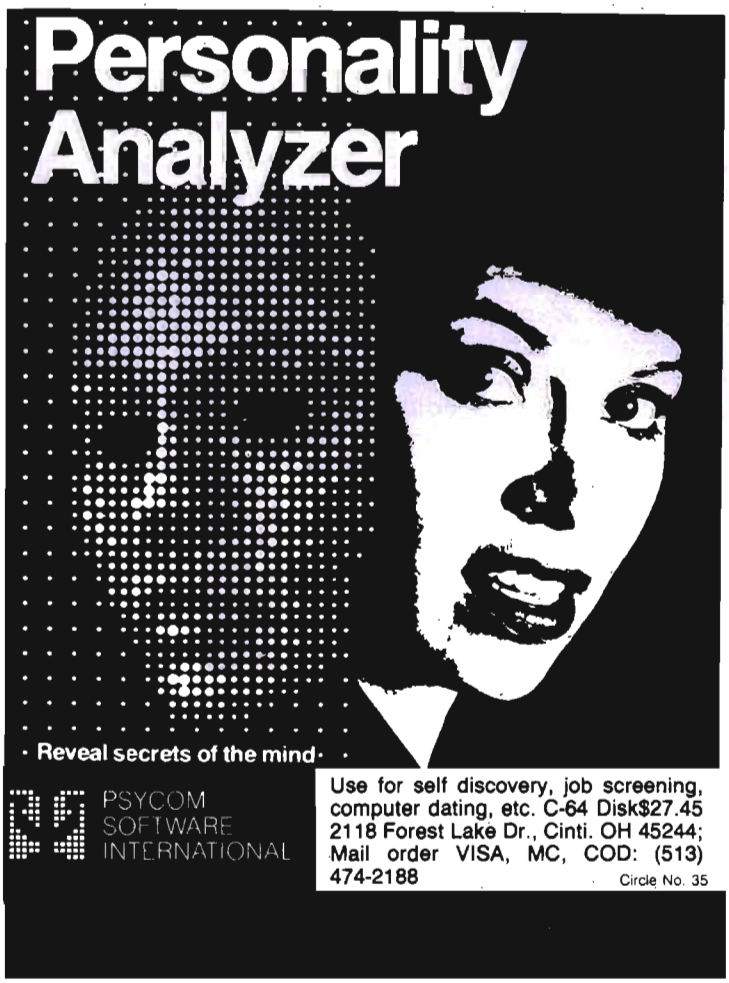
ASSETS		**LIABILITIES**	
Cash	6,000	Notes Payable	70,000
Automobile	5,000		
House	100,000		
		EQUITY	
		Owner equity	41,000
TOTAL ASSETS	111,000	TOTAL EQUITY & LIABILITIES	111,000

Figure 2

```
                CASH

      DEBIT      *      CREDIT
      ************************
      1000       *
                 *       200
        50       *

ACCOUNT BALANCE: 850 (DEBIT)
```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credit balance. This is actually determined by the logic of the accounting equation we discussed earlier. As we also discussed, these three main classifications are summarized in a financial report called a balance sheet. In looking at a balance sheet one will notice the assets on the left hand side of the report while the liabilities and equity are listed on the right hand side (refer to Figure #1). Notice the total of the assets equal the total of the liabilities and equity. This is exactly what our accounting equation tells us should happen when everything is correct and in balance. Now, the accounts listed on the balance sheet (automobile, etc...) have the account balance listed on the report. The account balance is arrived at through posting transaction data to the account ledger from a journal. (We will talk about journals later in the article.)

Each account that appears on the balance sheet has either a debit or credit balance depending upon whether it is an asset, liability, or equity account. When entries are made to an account you either debit or credit the account. In other words, you either record the amount of the transaction on the left or the right hand side of the account ledger. A simple account ledger can be represented by the "T account" in Figure #2. If an account is an asset account, then it has a debit balance. Any entries to increase the balance of the account would be recorded on the left hand side of the ledger account. Therefore, to increase (add to) an asset account you debit it. To decrease an asset account you would do the opposite of increasing it. This means that you would credit the account ledger by entering the amount on the right hand side of the ledger. To arrive at an account balance that would be transferred to the balance sheet you would first prove your debit and credit entries by using a "trial balance". A trial balance is a way to make sure that all of your debits equal all of your credits. If they don't, then your books are out of balance and you've most likely made a posting or addition error. Your debits must equal your credits because a general ledger accounting system uses what is termed the "double entry method" of entering transactional data. The basic rational is that every transaction that takes place affects at least two or more accounts. If only two accounts are affected then one is debited and one is credited. If more than two accounts are involved the sum of the debits must equal the sum of the credits. For example, let's use our home purchase illustration again . Instead of having to go for a loan of your house purchase you just happen to have $100,000 on hand from last year's sale of mineral rights on some raw land that you own in Saudi Arabia. Therefore, you walk in and place the entire amount in the seller's hand and, after he recovers, you go home and enter the transaction on your computerized bookkeeping system. You call up your cash journal and enter a $100,000 credit to your cash account and create a new asset of $100,000 called "house", which you appropriately debit for $100,000. At the end of the posting, your credits equal $100,000 and your debits equal $100,000. This transaction resulted in no net change to your total assets because your already had the cash on hand of $100,000 (previously recorded from the sale of mineral rights), and you "exchanged" that $100,000 cash asset for a $100,000 house asset. Therefore, if you remember our balance sheet, no entry to equity is called for because the asset base was not increased. But, let's look at a second example. One in which the transaction involves more than two accounts.

You are back in your original situation where you have been able to scrape up $30,000 for a down payment on that $100,000 dream house. You have borrowed the remaining $70,000 and closed the deal. Now, at home, you're entering the transaction into your computer. You properly credit (decrease) your cash account by $30,000 and then you debit (increase) a new asset account called "house" for $100,000. Wait, you're not done. Your debits of $100,000 do not equal your credits of $30,000. You must come up with a $70,000 credit to make your books balance. You do this by crediting (increasing) the LIABILITY account called "notes payable". Remember, you had to borrow that $70,000 and the credit to notes payable accounts for that debt and balances your books! In applying this back to our accounting equation, you now have a $100,000 asset for which you paid $30,000, which becomes your equity, and is represented by the $100,000 asset less the $70,000 liability.

So, now you should be able to understand what is meant when we say that your debits must equal your credits. It is all based upon one simple equation and the trial balance is just the check point in a general ledger system to make certain that you have posted all your credits and debits.

Definitions . . . Again!

You undoubtedly noticed that I previously have made mention of a "journal". Well, I do believe an explanation is in order. A journal is what accountants call an original book of entry. It's a daily record showing the various debit and credit changes which affect the several ledger accounts. It is quite standard for a journal to include a description or explanation of the transaction. If you are confused about the distinction between a journal and a ledger account, the easiest way to remember the difference is to think of the journal as organized specifically for recording and maintaining a record of transactions. The ledger, instead, is

organized to maintain the accounts themselves. At periodic intervals (for example, once per month) the transactions recorded in the journal(s) are posted to the ledger and the appropriate accounts are debited and credited. The journal also has debit and credit entries that are made when transactions are recorded. In a manual journal there is a column for debits as well as credits. If you were recording a trip to the grocery store you would, after entering the date, enter your transaction information using the same rules for debit and credit that we have already discussed. Food is an expense and expenses have debit balances because they decrease equity. The cash you used to buy the food evidences a decrease in cash which would be a credit. In entering transactions to a journal it is customary to always enter the debit first, then the credit, with the explanation of the transaction following. When you go to post from the journal, you would pick up the credit to cash and credit the cash account for that amount. Likewise, you would post the debit to the food account.

The journal provides a link between several debit and credit entries in the various accounts, showing which are related to which transaction. As in our food example, if you were to look at the accounts "cash" or "food" you would have some difficulty connecting the given cash expenditure with food, unless you had a very good memory. Therefore, the journal is a vitally important tool in an accounting system.

The General Ledger

The Business Man™, by Southern Solutions, is a "general ledger record keeping system". In other words, the basis for the program's accounting system and processing of financial information is a general ledger.

A general ledger is defined as an accumulation register for all types of accounts. Transactions are entered in the journal(s) and then posted to the various accounts in the ledger. At the end of the accounting period the accounts are "closed" and the balances used to prepare the financial reports. This is the fundamental operation of the program that we will be reviewing in part two of this series. Remembering this process will help you tremendously not to lose perspective when we start talking about what The Business Man™ can do.

The Business Man™ has two journals (original books of entry). One is called the "general journal" and the other the "cash journal".

The General Journal

This is often called the easiest journal to work with, so, it is a good place to begin. A manual general journal has a column for debits, credits, account titles, explanations, and the date. You will also find a thin reference column with the heading "LP". This stands for "ledger page" and helps provide that link we talked

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		Disk	39.00	34.00

All of the features of Total Text BASIC with 3K additional working memory for editing, footnoting, right margin justification, and up to 4 heading lines per page. Req. 8K exp.

Total Label	2.1	Tape	20.00	16.00
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Creates personal or business schedules, calendars of events, and checklists of activities. Describe each activity, the person responsible, project codes, dates, times and comments. Req. 8K exp.

Research Assistant	2.0	Tape	30.00	26.00
	2.0	Disk	34.00	29.00

This is a set of programs which allows you to keep track of reference data and create keyword cross reference lists. Requires 8K expansion.

Total Software for C-64™

Total Text	2.6	Disk	44.00	40.00
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about earlier. When you post to the ledger from the journal you would normally place the page of the ledger that contains the posted account in the "LP" column next to the debit or credit you are posting. This leaves what accountants like to call "tracks". This way you can later follow where you've been and what you've been doing. This step is absolutely necessary for a proper audit trail. Any computerized system that doesn't have some way to trace the journal entry to the ledger has failed a very important test. There is absolutely no value in using a "full-blown" accounting system that doesn't leave a proper audit trail. If your books are ever looked at by someone else (say the IRS) and they run into this kind of trouble you will have a difficult time explaining yourself. (If this ever happens to you, what good did all that money you spent on the program do you?) Be very careful to watch for this before you buy any accounting software. I cannot stress this point enough.

Subsidiary Journals

The general journal is for all types of transactions and can reference any account; that's why it's called a general journal. But if you want to segregate your cash transactions into one place, for whatever reason, you would use a "cash journal".

In manual ledger systems there are two cash journals. One is called the "cash receipts journal" and the other the "cash payments journal". Obviously their respective purposes are quite clear. The former records all receipts of cash while the latter records all transactions resulting in disbursement of cash. The Business Man™, by Southern Solutions, uses the cash journal as both a cash receipts and payments journal. When you call up the cash journal from the program menu the first thing asked is if you are recording transactions dealing with either receipts of cash or disbursements. The net result is the same. Transactions representing receipts of cash are segregated from those of disbursements.

For most individuals, a general journal serving as the original book of entry would do just fine. For business organizations, more detail in recording transactions affecting either the balance sheet accounts or the income statement accounts (to be defined later) is often required. Subsidiary journals and ledgers provide this detail which is an important justification of the general ledger account balance. As discussed, the general ledger contains all asset, liability, equity, revenue, and expense accounts. These general ledger accounts are often called "control accounts", because they contain the sum of all the related subsidiary ledger accounts. For example, in your general ledger you would have an accounts payable control account. The balance of this control account would be comprised of the individual balances of all your subsidiary, or, individual accounts payable. Therefore, posting would occur from the journal to the subsidiary ledger to the general ledger; each one providing a check upon the other.

The Income Statement

We're going to wrap up this first article with a look at the so called "bottom line" and the accounting statement that provides the perspective for that look.

The balance sheet that we looked at earlier shows us the overall financial position of the person or firm we're looking at. In contrast, the income statement shows us the actual revenue from operations. Revenue is the gross amount of asset value received through operations. It would include both cash and accounts receivable (credit sales). There is often a tendency to call all cash brought into the operation revenue. This is not proper. Not every receipt of cash is revenue. For instance, when we borrowed $70,000 to purchase the dream house earlier, the $70,000 was brought into our "operation" but it is not revenue. The distinction here is that the equity did not change (increase) due to the borrowing transaction itself which brought the funds into the organization. A second example would deal with collection of an outstanding debt (account receivable) you may have. The revenue is properly recorded at the time the receivable is created so when the funds are collected and received, it simply results in the decrease of the asset "accounts receivable" and an increase in the asset "cash". The net effect is no change in the total asset/equity position.

The most important concept behind the income statement is that it shows revenue over certain periods of time. If I were to tell you I made $200,000, that wouldn't give you much information. But if I told you I made $200,000 over the last ten years, then you have an idea as to my financial position. This is the importance of relating income and expense data to time.

I'm sure you've heard of a "fiscal year". This represents a period of time used to accumulate, segregate, and identify financial data. An "accounting period" is the length of time covered by the income statement. It is also a period of time by which you schedule your financial reporting. This can be monthly, quarterly, semiannually, or annually. Within this period you would usually perform your final postings and close out your books.

The actual definition of a fiscal year now becomes meaningful. Any period of time adopted by a business or individual that covers twelve (12) full months is known as a "fiscal year". An accounting period, therefore, is defined within your fiscal year.

The Business Man™ has different options for accounting periods. It allows you to choose between monthly, quarterly and annually. In using the system you can generate full accounting reports by accounting period. The Business Man™ also has a budget feature. The budget can be compared by accounting period to your actual performance so that you may evaluate where you stand as compared to where you wanted to be.

Revenue Vs. Expense

The accounts which adorn the income statement are called either revenue or expense accounts. The difference is so simple it will surprise you. Revenue accounts increase the equity (remember the balance sheet) while expenses decrease the equity. The convention for the debit and credit balances of these accounts follows the same debit and credit logic we discussed before. Equity accounts have a credit balance because they are listed on the right hand side of the balance sheet. To increase an account with a credit balance you credit it, while debiting the account decreases it. Revenue accounts increase the equity, therefore, a revenue account would have a credit balance. Expense accounts, on the other hand, decrease the equity. Consequently, an expense account would have a debit balance.

Account ledgers are kept for revenue and expense accounts just as for asset, liability, and equity accounts. Transactions are recorded and postings made to the accounts in the same fashion.

I'm sure that you can see accounting in a general ledger system is fairly straightforward and consistent. After all this information we've gone through in the first part of our review you should have no trouble understanding and working with most general ledger accounting systems including The Business Man™. As you work with them, your knowledge and understanding will continue to grow and before long you'll be an expert.

For our purposes of evaluating The Business Man™ this background will help us in part two of this series to concentrate on the capabilities of the program instead of "accounting". I sincerely hope that you find this information helpful and useful in other areas besides evaluating software. I look forward to next month when we will scrutinize Southern Solutions' Business Man™.□

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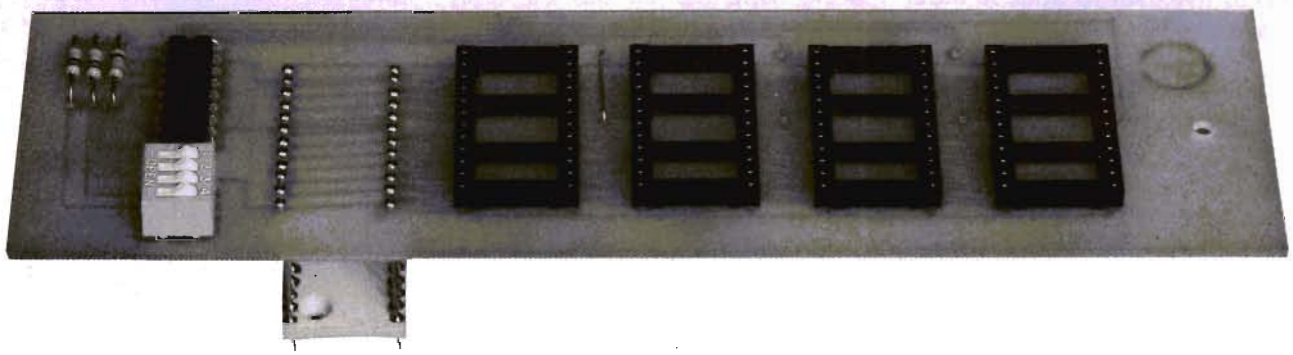

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So You Bought A Disk Drive

Part II

A primer for the Commodore 1540/1541 Disk Drive
by R. G. Partner

In the July issue of COMMANDER MAGAZINE I covered the use of a program on the TEST/DEMO DISK enclosed with the 1540/1541 disk drives titled: VIC-WEDGE. This program 'WEDGES' into memory above user basic, allowing the user to access most of the DISK COMMANDS. Since it does 'WEDGE' above basic you are able to load BASIC programs into the computer without losing the ability to perform disk commands at the touch of a key (or two). While monitoring information on the new 1541 disk drives I discovered that Commodore was not including the 'WEDGE' program on some of the new TEST/DEMO disks. A short time later they began including two programs titled: C-64 WEDGE and DOS 5.1. C-64 WEDGE is a LOADER program, i.e., it loads the program DOS 5.1.

If you have a 1540 disk drive or the 1541 disk drive and find the TEST/DEMO disk does not include VIC-WEDGE or the C-64 WEDGE/DOS 5.1, check with your local Commodore dealer. He may be able to help you out. Now let's see what new things we can learn about the 1540/1541 disk drive.

I have included in this article two programs. These programs should help out those of you who may have need to change the NAME (or HEADER) on your disk (see figure 1 & 2) and a program to allow you to change the disk ID number (see figure 3 & 4). A good friend, Jack Marx, did some translating and re-writing so they would work on the VIC. I re-wrote those sections that were applicable to the C-64. I include both versions at the end of this article and hope that they may be of help for those of you needing to make some changes on your disks.

C-64 WEDGE

This 'WEDGE' has many features that the VIC-20 'WEDGE' does not have. It supports all the disk commands found in the Disk Operating System and in BASIC.

This makes it an extremely powerful tool to have in place when operating the disk. Unlike the VIC 20 WEDGE the C-64 gives no hints about use after loading. It simply gives a title line and a credit line to the writer and a READY indication. The DISK DRIVE BOOK is of little help; in fact one Disk Drive Book I have makes no mention of it at all. Many of the same commands that were available with the VIC WEDGE are the same on the C-64 WEDGE. There are, however, many new commands which make the C-64 WEDGE much more powerful and versatile.

The following is a description of the C-64 WEDGE commands:

The '@' and '>' symbols are used interchangeably. I find the '>' (greater than symbol) easier to use many times. The main disadvantage is that the shift key must be pressed to access it. The '@' (commercial at symbol) does not require a shift to reach it but it is not a key I am used to hitting when typing. Use whichever one is comfortable to you.

@—This symbol used alone will provide the user with the current disk status. It performs the same function as typing in the following BASIC code:

```
10 OPEN 15,8,15
20 INPUT#15,A,B$,C,D
30 PRINT A;B$;C;D
```

I am sure you can see a slight time savings using this command.

@$ or $—This is the 'READ DISK DIRECTORY COMMAND'. It

To be continued on page 112

Figure 1

```
1 REM-----------------------------------
-
2 REM  20.NEW ID
3 REM  REVISED BY JACK MARX
4 REM  WRAPPED BY R.G.PARTNER
5 REM-----------------------------------
-
10 OPEN 9,0,0:OPEN 15,8,15
15 POKE 36879,233
20 REM  POKE 59468,12:REM SCREEN MEM
30 MD$="[HOME]":FORI=1 TO 32:MD$=MD$+"[
DOWN]":NEXT
40 FORI=1 TO 39:BL$=BL$+" ":NEXT
50 P0$="[CLEAR][DOWN][DOWN][DOWN][RIGHT
][RIGHT][REV][RED]DISK I D # CHANGER:
60 RE$="    [BLACK]PRESS [REV]RETURN
70 DATA2,OUT OF RANGE,TOO LONG
80 READ A:DIM EM$(A):FORI=1 TO A:READ E
M$(I):NEXT
99 GOTO1000
100 INPUT#15,ER:IF ER=0 THEN RETURN
110 INPUT#15,ER,EM$,ET$,ES$
120 PRINTMD$"[REV]DISK ERROR![OFF] #"ER
" "EM$" "ET$", "ES$
130 END
200 INPUT#9,Q$:PRINT:Q1$=LEFT$(Q$,1):RE
TURN
300 CLOSE 2:CLOSE 15:POKE 59468,PK:PRIN
T"[CLEAR]":PRINT"[RIGHT][RIGHT][RIGHT][
RIGHT][RIGHT][RIGHT]END":END
400 PRINT LEFT$(MD$,MD)BL$:PRINT BL$
410 PRINT LEFT$(MD$,MD);:RETURN
500 MD=21:GOSUB400
510 PRINT"[REV]UNACCEPTABLE ENTRY -- "E
M$(EM)
520 PRINT RE$:GOSUB 200:GOSUB 400
530 RETURN
1000 F=0:PRINTP0$
1020 DV=0
1040 PRINT P0$:PRINT"[DOWN]PLACE DISK I
N DRIVE"DV"[DOWN]"
1041 REM [CD][CD]
1050 PRINT RE$:GOSUB 200
1060 PRINT#15,"I"+STR$(DV):GOSUB 100
1070 OPEN 2,8,2,"#":PRINT#15,"U1:2";DV;
",18,0":GOSUB 100
```

will NOT overwrite a program in memory. This is the same command that is used for obtaining a directory with the VIC-WEDGE except that the commercial '@' symbol is used instead of the '>' symbol. You may add a semicolon and then specify a file you are searching for. Another bonus is that you may add an '*' after the FILENAME. You may then add a second command which I will call RECORD.

This allows you to set up files with a RECORD number/ character and search for ONLY those files with a specific RECORD number.

Here is an example:

@$O:FILENAME*RECORD

@SO:FILENAME and

@SO:FILENAME*RECORD

—This command has remained the same. It will scratch the file specified by the FILENAME. You may specify a particular RECORD within a particular FILE if you use the second example.

@RO:NEWFILE NAME=OLD FILENAME—This command RENAMES an existing disk file. You must specify the NEW FILENAME first then the '=' and OLD FILENAME remains the same as with the VIC-WEDGE.

QU1—This command resets the Disk Drive DOS.

@IO—This command updates the Directory and BAM (Block Availability Map) in the disk drive. If you should find yourself with two diskettes having identical ID numbers or characters this command can be used to update the Disk Directory and the BAM (Block Availability Map).

@Q—Use this command if you wish to quit using the 'WEDGE'.

/FILENAME—This will load the program specified by 'FILENAME' into the computer. It will NOT load MACHINE LANGUAGE programs to the proper address. It will load all programs at the start of C-64 Basic. On the C-64 this will be at $0800 or decimal 2048. The VIC loads at $1200 or decimal 4096/4606). It will also load programs that Boot from Basic.

%FILENAME—This is one of the new commands added to the wedge. With this command you can load machine code programs at their OWN LOAD ADDRESS. If you were doing this from BASIC it would look like this:

LOAD"FILENAME",8,1; press RETURN

(up arrow) FILENAME—This is what I call the AUTO RUN command. It will load a BASIC program and once loaded automatically run it without you typing the command RUN. I must stress again that this will ONLY WORK WITH BASIC PROGRAMS OR PROGRAMS THAT ARE BOOTED FROM BASIC.

As you can see this has greatly enhanced the value of the 'WEDGE' particularly in loading and saving programs from the 'WEDGE'. One of my pet complaints about the VIC-WEDGE was that I could not load Machine Code programs from the 'WEDGE'.

Advanced Disk Commands

As I promised, we are going into some of the more advanced disk commands. Those of you who are more adventurous can type in the accompanying code and have some fun learning more about your disk drive operation. I would highly recommend that you DO NOT USE a good disk (i.e., a disk with good programs on it) for your experimentation:

U1 or B-R—BLOCK READ command has been replaced by the command U1.

This command allows you to read any block on a normally formatted disk. This disk must have been formatted in the same way that the drive reads it. An example of different formatting is trying to read a disk formatted on an 8050 drive using your 1541 drive. The tracks are formatted differently and you will be unable to read those disks. U1 or B-R may sometimes be used to recover information stored on a disk which may have been destroyed during the save operation. Sometimes this

Continued from page 111

```
1080 PRINT#15,"B-P:2,162":GOSUB 100:DN$
=""
1090 FOR I=1 TO 16:GET#2,A$:DN$=DN$+A$:
NEXT
1100 MD=10:GOSUB 400:IF F THEN RETURN
1110 PRINT"[BLUE]THE DISK ID # IS[BLACK
]"
1120 PRINT TAB(5) CHR$(34) DN$ CHR$(34)
1130 MD=13
1170 MD=16
1175 PRINT"[RED]     ENTER"
1180 PRINT"[BLACK]NEW DISK ID #":PRINT"
LIMIT TO 2  CHARACTERS [REV]"
1190 GOSUB 200:IFLEN(Q$)>2THEN EM=2:GOS
UB 500:MD=18:GOSUB 400:GOTO 1190
1200 NDN$=LEFT$(Q$+BL$,2)
1210 MD=21:GOSUB 400
1220 PRINT"SHALL I SEND [REV]"NDN$
1230 PRINT"TO THE DISKETTE ON DRIVE"DV"
? (Y/N) [REV]";
1231 INPUT E$
1232 IF E$="N"THEN300
1240 GOTO 1270
1250 IFQ1$<>"N"THEN GOSUB 400:MD=18:GOT
O 1170
1260 GOTO 1210
1270 MD=21:PRINT"BE PATIENT...
1280 PRINT#15,"B-P:2,162":GOSUB 100
1290 PRINT#2,NDN$;:GOSUB 100
1300 PRINT#15,"U2:2";DV;",18,0":GOSUB 1
00
1310 PRINT#15,"I"+STR$(DV):GOSUB 100:CL
OSE 2
1320 F=1:PRINT P0$:GOSUB 1060:F=0
1330 PRINT"THE NEW DISK NAME IS:
1340 PRINT CHR$(34) DN$ CHR$(34)
1350 CLOSE2:MD=21:GOSUB 400:PRINT"DO YO
U WISH TO DO
1360 PRINT"ANOTHER DISKETTE? (Y/N) [REV
]"
1369 INPUT U$
1370 IFU$="Y"THEN 1040
1380 IFU$="N"THEN 300
1390 GOTO 1361
```

Figure 2

```
1 REM-----------------------------------
-
2 REM 20.NEW NAME
3 REM REVISED BY JACK MARX
4 REM WRAPPED BY R.G. PARTNER
5 REM -----------------------------------
```

To be continued on page 114

Commodore 64 and VIC-20 Graphics

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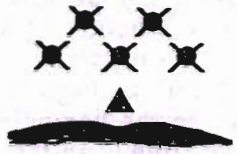

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command can be used to reconstruct a partially destroyed sector.

Here is an example of the syntax:

PRINT#15,"U1";Channel number;drive;track;sector

OR:

PRINT#15,"U1":a string of four characters which represent Channel; Drive; Track; Sector.

When the BLOCK-READ command is encountered in the program the command is read into the buffer and the buffer pointer is set to the beginning bit of the buffer. This is so that the first bit of information may be read from the beginning. The buffer pointer may be set to read at any Byte by using the B-P Command.

Here is a short Basic routine to read 256 characters from any sector and display it to the screen:

```
10 OPEN 1,8,2,"#":OPEN
   15,8,15
20 INPUT "DRIVE, TRACK,
   SECTOR";D,T,S
30 PRINT#15,"U1";2;D;T;S
40 GET#1;X$:IF ST = 64
   GOTO 20
50 PRINT X$;: GOTO40
```

With a slight modification this could allow you to daisy chain sectors together.

B-P—BUFFER POINT command:

This command controls the pointer position to a buffer which is used by the BLOCK commands. This command must be used when PRINTING data to a buffer and when reading data from a buffer. Here is an example of the syntax:

There are only two parameters needed for BLOCK POINTER to work.

(1) The buffer channel number

(2) Byte position which is usually a number between 1 and 255.

Thus we have the command:

PRINT#15,"B-P";channel number; byte position

With this information and the fact that each file's data occupies 32 bytes we should be able to write a program that will read any sector from the directory so here we go:

Continued from page 112

```
10 OPEN9,0,0:OPEN15,8,15:POKE36879,127
20 POKE59468,12
30 MD$="[HOME]":FORI=1TO20:MD$=MD$+"[DO
WN]":NEXT
40 FORI=1TO39:BL$=BL$+" ":NEXT
50 P0$="[CLEAR][DOWN] [DOWN][BLACK] DIS
K NAME CHANGER
60 RE$="PRESS    [REV][BLUE]RETURN[OFF]
70 DATA2,OUT OF RANGE,TOO LONG
80 READA:DIMEM$(A):FORI=1TOA:READEM$(I)
:NEXT
99 GOTO1000
100 INPUT#15,ER:IFER=0THENRETURN
110 INPUT#15,ER,EM$,ET$,ES$
120 PRINTMD$"[REV]DISK ERROR![OFF] #"ER
" "EM$" "ET$", "ES$
130 END
200 INPUT#9,Q$:PRINT:Q1$=LEFT$(Q$,1):RE
TURN
300 CLOSE2:CLOSE15:POKE59468,PK:PRINT"[
CLEAR]":END
400 PRINTLEFT$(MD$,MD)BL$:PRINTBL$
410 PRINTLEFT$(MD$,MD);:RETURN
500 MD=21:GOSUB400
510 PRINT"[REV]UNACCEPTABLE ENTRY -- "E
M$(EM)
520 PRINTRE$:GOSUB200:GOSUB400
530 RETURN
1000 F=0:PRINTP0$
1005 PRINT"[DOWN]ON WHICH DRIVE FOR CHA
NGES? (0/1) [REV]";:INPUTQ$
1020 DV=VAL(Q$):REM IFDV<0ORDV>1THENEM=
1:GOTO1000
1030 IFDV=0ANDQ1$<>"0"THENEM=1
1040 PRINTP0$:PRINT"[DOWN]PLACE DISK IN
 DRIVE"DV"[DOWN]"
1050 PRINTRE$:GOSUB200
1060 PRINT#15,"I"+STR$(DV):GOSUB100
1070 OPEN2,8,2,"#":PRINT#15,"U1:2";DV;"
,18,0":GOSUB100
1080 PRINT#15,"B-P:2,144":GOSUB100:DN$=
""
1090 FORI=1TO16:GET#2,A$:DN$=DN$+A$:NEX
T
1100 MD=10:GOSUB400:IF F THEN RETURN
1110 PRINT"THE PRESENT DISK NAME IS":PR
INT"[BLACK]"
1120 PRINTTAB(5)"[BLACK]"CHR$(34)DN$CHR
$(34)
1130 MD=13
1140 PRINT"[BLUE]DO YOU WISH TO CHANGE
IT? (Y/N) [REV]";:GOSUB200
1150 IFQ1$="N"THEN1350
```

To be continued on page 116

64K for VIC 20™

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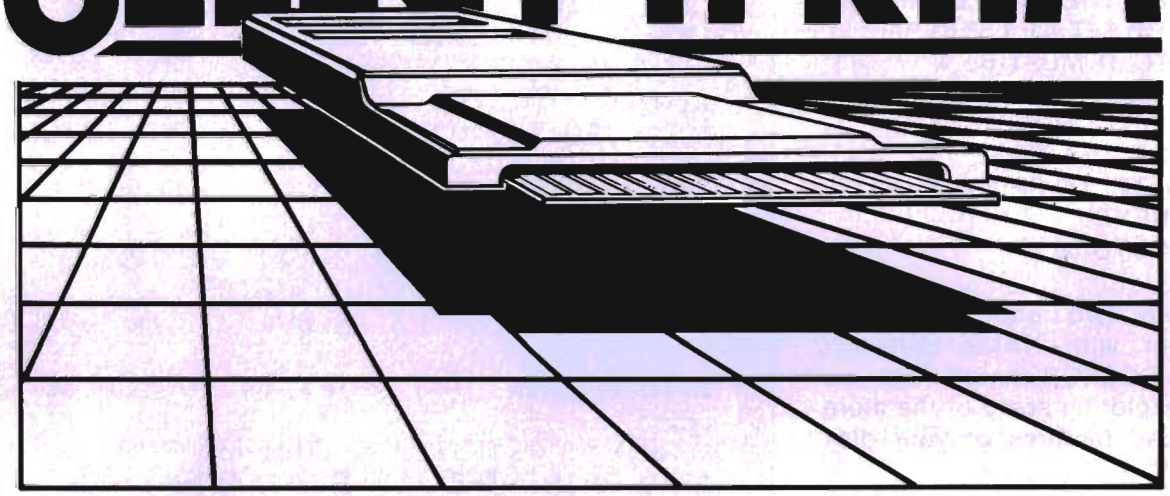

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```
10 REM DIRECTORY TRACK
   IS = 18 SECTORS = 19
20 OPEN 1,8,2,"#": OPEN
   15,8,15
30 INPUT"DRIVE, SECTOR";
   D,S
40 PRINT#15,"U1",2,D,18,S
50 INPUT"WHICH FILE ";F
60 PRINT#15,"B-P";2;32*F-31
   :REM THE POINTER MUST
      BE SET AT 1,33,65,97
   :ETC. IT MUST BE A
      MULTIPLE OF 32.
70 PRINT CHR$(34);
80 FOR J = 1 TO 32
90 GET#1,X$: PRINT X$
100 NEXT J
110 GOTO 50
```

These two short programs together with NAME DOCTOR and ID DOCTOR should keep you busy exploring some of the more advanced features of your disk drive.

There are some additional advanced commands available for disk use; however, I think until you master the use of these it would be best to avoid their use. One command will allow you to write directly to a block on the disk; this is the BLOCK-WRITE (replaced by U2) command. There is a BLOCK-ALLOCATE command which when used prevents a sector on the disk from being overwritten by data or program. There is a BLOCK-EXECUTE command which is like the LOAD-RUN feature of Basic. It loads a specified sector into the buffer then in machine language jumps to the start of the buffer and executes the program until it encounters a RTS command (that's like a GOSUB and RETURN command in Basic). When it finds the RTS command it returns to the Basic program using the B-E command. You will find this command seldom used as it requires a very detailed knowledge of the Disk Operating System ROM. Few programmers have that detailed knowledge and that is one bit of information Commodore has not shared with us yet. As you can see what you bought as a simple

Continued from page 114

```
1170 MD=16
1180 PRINT"ENTER NEW DISK NAME":PRINT"L
IMIT TO 16 CHARACTERS [REV]"
1190 GOSUB200:IFLEN(Q$)>16THENEM=2:GOSU
B500:MD=18:GOSUB400:GOTO1190
1200 NDN$=LEFT$(Q$+BL$,16)
1210 MD=21:GOSUB400
1220 PRINT"SHALL I SEND [REV]"NDN$
1230 PRINT"TO THE DISKETTE ON DRIVE"DV"
? (Y/N) [REV]";:GOSUB200
1240 GO TO1270
1250 IFQ1$<>"N"THENGOSUB400:MD=18:GOTO1
170
1260 GOTO1210
1270 MD=21:PRINT"BE PATIENT...
1280 PRINT#15,"B-P:2,144":GOSUB100
1290 PRINT#2,NDN$;:GOSUB100
1300 PRINT#15,"U2:2";DV;",18,0":GOSUB10
0
1310 PRINT#15,"I"+STR$(DV):GOSUB100:CLO
SE2
1320 F=1:PRINTP0$:GOSUB1060:F=0
1330 PRINT"THE NEW DISK NAME IS:
1340 PRINT"[BLUE]"CHR$(34)DN$CHR$(34)
1350 CLOSE2:MD=21:GOSUB400
1360 PRINT"[BLACK]ANOTHER DISKETTE? (Y/
N) [REV]";:INPUTF$
1370 IFF$="Y"THEN1040
1380 IFF$="N"THEN300
1390 GOTO1040
```

Figure 3

```
1 REM-------------------------------
-
2 REM          64.NEW ID
3 REM     REVISED BY JACK MARX
4 REM   WRAPPED BY R.G. PARTNER
5 REM
6 REM-------------------------------
-
10 OPEN9,0,0:OPEN15,8,15
15 POKE53280,14:REM BORDER COLOR
16 POKE 53281,1:REM SCREEN COLOR
30 MD$="[HOME]":FORI=1TO32:MD$=MD$+"[DO
WN]":NEXT
40 FORI=1TO39:BL$=BL$+" ":NEXT
50 P0$="[CLEAR][DOWN][DOWN][DOWN][RIGHT
][RIGHT][REV][RED]DISK I D # CHANGER:
60 RE$="    [BLACK]PRESS [REV]RETURN
70 DATA2,OUT OF RANGE,TOO LONG
80 READA:DIMEM$(A):FORI=1TOA:READEM$(I)
:NEXT
```

To be continued on page 118

Circle No 45

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Circle No. 84

disk drive has far greater capability than you may have expected. You can spend many interesting hours looking into the internal workings of your disk drive.

Those of you who have a 1540 and are contemplating the purchase of a C-64 need not despair. RELIABLE SOURCES tell me that an UP-GRADE ROM has been manufactured but not released yet. I have been attempting to confirm this with Commodore directly. To date they have been reluctant to confirm or deny the ROM. The 1540 disk drive will work with the C-64. The one hitch is not really a hitch at all. You simply need to turn off the screen while loading in a program.

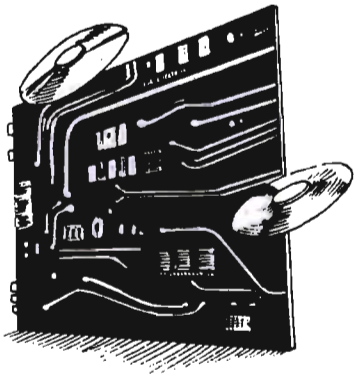
This is accomplished as follows:

POKE 53265,11
LOAD"PROGRAM NAME",1
(or ,8 for disk drive)

You are addressing the VIC (Video Interface Chip) control register with this POKE. The screen will blank out while the program loads. Once the loading process has been completed you will need to type in the following command: (you will be typing 'blind', i.e., with no lettering on the screen, so be careful)

POKE 53265,27

That completes the process. I am sure you can write a short routine to reside in protected memory. Once that is done you can forget about typing it in each time. Perhaps you could use the function keys to perform the commands.□



Continued from page 116

```
99 GOTO1000
100 INPUT#15,ER:IFER=0THENRETURN
110 INPUT#15,ER,EM$,ET$,ES$
120 PRINTMD$"[REV]DISK ERROR![OFF] #"ER
" "EM$" "ET$", "ES$
130 END
200 INPUT#9,Q$:PRINT:Q1$=LEFT$(Q$,1):RE
TURN
300 CLOSE2:CLOSE15:POKE59468,PK:PRINT"[
CLEAR]":PRINT"[RIGHT][RIGHT][RIGHT][RIG
HT][RIGHT][RIGHT]END":END
400 PRINTLEFT$(MD$,MD)BL$:PRINTBL$
410 PRINTLEFT$(MD$,MD);:RETURN
500 MD=21:GOSUB400
510 PRINT"[REV]UNACCEPTABLE ENTRY -- "E
M$(EM)
520 PRINTRE$:GOSUB200:GOSUB400
530 RETURN
1000 F=0:PRINTP0$
1020 DV=0
1040 PRINTP0$:PRINT"[DOWN]PLACE DISK IN
 DRIVE"DV"[DOWN]"
1050 PRINTRE$:GOSUB200
1060 PRINT#15,"I"+STR$(DV):GOSUB100
1070 OPEN2,8,2,"#":PRINT#15,"U1:2";DV;"
,18,0":GOSUB100
1080 PRINT#15,"B-P:2,162":GOSUB100:DN$=
""
1090 FORI=1TO16:GET#2,A$:DN$=DN$+A$:NEX
T
1100 MD=10:GOSUB400:IF F THEN RETURN
1110 PRINT"[BLUE]THE DISK ID # IS[BLACK
]"
1120 PRINTTAB(5)CHR$(34)DN$CHR$(34)
1130 MD=13
1170 MD=16
1175 PRINT"[RED]      ENTER"
1180 PRINT"[BLACK]NEW DISK ID #":PRINT"
LIMIT TO 2  CHARACTERS [REV]"
1190 GOSUB200:IFLEN(Q$)>2THENEM=2:GOSUB
500:MD=18:GOSUB400:GOTO1190
1200 NDN$=LEFT$(Q$+BL$,2)
1210 MD=21:GOSUB400
1220 PRINT"SHALL I SEND [REV]"NDN$
1230 PRINT"TO THE DISKETTE ON DRIVE"DV"
? (Y/N) [REV]";
1231 GETE$:IFE$=""THEN1231
1232 IFE$="N"THEN300
1240 GOTO 1270
1250 IFQ1$<>"N"THENGOSUB400:MD=18:GOTO1
170
1260 GOTO1210
1270 MD=21:PRINT"BE PATIENT...
1280 PRINT#15,"B-P:2,162":GOSUB100
```

To be continued on page 120

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Continued from page 118

```
1290 PRINT#2,NDN$;:GOSUB100
1300 PRINT#15,"U2:2";DV;",18,0":GOSUB10
0LIST 300-350
1310 PRINT#15,"I"+STR$(DV):GOSUB100:CLO
SE2
1320 F=1:PRINTP0$:GOSUB1060:F=0
1330 PRINT"THE NEW DISK NAME IS:
1340 PRINTCHR$(34)DN$CHR$(34)
1350 CLOSE2:MD=21:GOSUB400:PRINT"DO YOU
 WISH TO DO
1360 PRINT"ANOTHER DISKETTE? (Y/N) [REV
]"
1361 GETU$:IFU$=""THEN1361
1370 IFU$="Y"THEN1040
1380 IFU$="N"THEN300
1390 GOTO1361
```

Figure 4

```
1 REM-------------------------------------
-
2 REM           64.NEW NAME
3 REM       REVISED BY JACK MARX
4 REM      WRAPPED BY R.G.PARTNER
5 REM-------------------------------------
-
10 OPEN9,0,0:OPEN15,8,15:POKE53280,14:P
OKE 53281,15
20 POKE59468,12
30 MD$="[HOME]":FORI=1TO20:MD$=MD$+"[DO
WN]":NEXT
40 FORI=1TO39:BL$=BL$+" ":NEXT
50 P0$="[CLEAR][DOWN] [DOWN][BLUE] DISK
 NAME CHANGER
60 RE$="PRESS    [REV][BLUE]RETURN[OFF]
70 DATA2,OUT OF RANGE,TOO LONG
80 READA:DIMEM$(A):FORI=1TOA:READEM$(I)
:NEXT
99 GOTO1000
100 INPUT#15,ER:IFER=0THENRETURN
110 INPUT#15,ER,EM$,ET$,ES$
120 PRINTMD$"[REV]DISK ERROR![OFF] #"ER
" "EM$" "ET$", "ES$
130 END
200 INPUT#9,Q$:PRINT:Q1$=LEFT$(Q$,1):RE
TURN
300 CLOSE2:CLOSE15:POKE59468,PK:PRINT"[
CLEAR]":END
400 PRINTLEFT$(MD$,MD)BL$:PRINTBL$
410 PRINTLEFT$(MD$,MD);:RETURN
500 MD=21:GOSUB400
510 PRINT"[REV]UNACCEPTABLE ENTRY -- "E
M$(EM)
520 PRINTRE$:GOSUB200:GOSUB400
530 RETURN
```

To be continued on page 122

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Continued from page 120

```
1000 F=0:PRINTP0$
1005 PRINT"[DOWN]ON WHICH DRIVE FOR CHA
NGES? (0/1) [REV]";:INPUTQ$
1020 DV=VAL(Q$):REM IFDV<0ORDV>1THENEM=
1:GOTO1000
1030 IFDV=0ANDQ1$<>"0"THENEM=1
1040 PRINTP0$:PRINT"[DOWN]PLACE DISK IN
 DRIVE"DV"[DOWN]"
1050 PRINTRE$:GOSUB200
1060 PRINT#15,"I"+STR$(DV):GOSUB100
1070 OPEN2,8,2,"#":PRINT#15,"U1:2";DV;"
,18,0":GOSUB100
1080 PRINT#15,"B-P:2,144":GOSUB100:DN$=
""
1090 FORI=1TO16:GET#2,A$:DN$=DN$+A$:NEX
T
1100 MD=10:GOSUB400:IF F THEN RETURN
1110 PRINT"THE PRESENT DISK NAME IS":PR
INT"[BLACK]"
1120 PRINTTAB(5)"[BLACK]"CHR$(34)DN$CHR
$(34)
1130 MD=13
1140 PRINT"[BLUE]DO YOU WISH TO CHANGE
IT? (Y/N) [REV]";:GOSUB200
1150 IFQ1$="N"THEN1350
1160 REM   IFQ1$<>"Y"THEN1130
1170 MD=16
1180 PRINT"ENTER NEW DISK NAME":PRINT"L
IMIT TO 16 CHARACTERS [REV]"
1190 GOSUB200:IFLEN(Q$)>16THENEM=2:GOSU
B500:MD=18:GOSUB400:GOTO1190
1200 NDN$=LEFT$(Q$+BL$,16)
1210 MD=21:GOSUB400
1220 PRINT"SHALL I SEND [REV]"NDN$
1230 PRINT"TO THE DISKETTE ON DRIVE"DV"
? (Y/N) [REV]";:GOSUB200
1240 GO TO1270
1250 IFQ1$<>"N"THENGOSUB400:MD=18:GOTO1
170
1260 GOTO1210
1270 MD=21:PRINT"BE PATIENT...
1280 PRINT#15,"B-P:2,144":GOSUB100
1290 PRINT#2,NDN$;:GOSUB100
1300 PRINT#15,"U2:2";DV;",18,0":GOSUB10
0
1310 PRINT#15,"I"+STR$(DV):GOSUB100:CLO
SE2
1320 F=1:PRINTP0$:GOSUB1060:F=0
1330 PRINT"THE NEW DISK NAME IS:
1340 PRINT"[BLUE]"CHR$(34)DN$CHR$(34)
1350 CLOSE2:MD=21:GOSUB400
1360 PRINT"[BLACK]ANOTHER DISKETTE? (Y/
N) [REV]";:INPUTF$
1370 IFF$="Y"THEN1040
1380 IFF$="N"THEN300
1390 GOTO1040
```

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Circle No. 68

the Critics Page

by Eric Giguere

The Lost Tomb of Egypt has finally been uncovered! As senior member of the archeological team, you, Dr. P. Ramid, have been chosen to explore the tomb. Your mission is to find and return four sacred golden tablets hidden within the tomb. After making a few changes to your will and saying goodbye to your friends you head for the tomb, determined to succeed.

You enter the tomb armed only with a supply of magic knives. While descending a ladder to the first level you notice that the entryway has been sealed off. A brief message tells you the only way out now is to find the four golden tablets and bring them back to this room. Each tablet has a magic word inscribed upon it, and saying these words will reopen the entrance. Until then you are trapped inside the tomb.

Upon taking a look around you notice that there are three doors leading to other rooms. Floating inside each doorway is the number of the room the door leads to, to aid you in finding your way. Helpful, these ancient Egyptians. Not sure where to go you pick a door at random and find yourself in room 9. This room has a ladder going down to the next level so you make a mental note of this and continue your explorations. You hear the hiss of a snake from one of the adjoining rooms. Not sure where it comes from you again pick a room at random. As you enter room 2 you realize this wasn't such a good choice: a snake attacks you. Whipping out one of your magic knives you move back and throw it at the snake. Got it! The snake falls dead on the floor, one less thing to worry about. You then notice a draft coming from one of the adjacent rooms, indicating a pit in one of them. It can't be from room 9, you just came from there. Feeling adventurous you choose room 17 and then wish you hadn't. You fell down the pit and landed on the second level. Luckily, you were only a bit dazed by the fall. You continue your search. Where are those tablets?

Robbers of the Lost Tomb

The above is a typical scene from the game Robbers of the Lost Tomb. Produced by Timeworks, Inc., for the Commodore 64 on both cassette and disk, Robbers of the Lost Tomb (no similarity to Raiders of the Lost Ark) offers a change of pace for those tired of arcade-style games. Instead of fighting off alien marauders you must watch out for snakes, ghosts, mummies and bottomless pits while trying to find the four sacred tablets. The use of graphics and real-time action makes Robbers of the Lost Tomb more enjoyable than regular, non-graphical adventure games. It's impressed Commander enough to use it for the September/October game contest. See the Game Contest column on page 152 for details.

Description

As was previously mentioned, your objective in Robbers of the Lost Tomb is to retrieve four sacred tablets found within the tomb and to achieve this in the least time possible. The tomb has five levels of 20 rooms, giving you a total of 100 rooms to explore. Using the keyboard or a joystick you must move your on-screen character throughout the tomb in search of the treasures. Each room you enter has three doors leading to other rooms: one on the left, one in the middle and one on the right. The rooms are designed to give a 3D perspective, as if you were looking from one of the walls into the center of the

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room. Consequently you can move the character away from or towards you, as well as left and right. And each time you move your character a measure of music is played. These things make the game far more interesting than a simple text adventure with no graphics.

Of course, there are other features to the game. To go up or down a level simply find a room with a ladder in the proper direction (a down ladder is indicated by an opening in the floor) and walk over to it. The program takes over and automatically moves you up or down as the case may be. It should be noted that once started, you cannot stop your ascent or descent until you are back on the floor. If there are any hazards in the room above or below, you had better be prepared to face them.

Aside from ladders you may find other helpful items in the rooms. Once in a while a magic knife will appear in a room. Move quickly to grab it, for if you enter another room and then return, it will have disappeared. To grab it simply pass over it and it will be included with your present arsenal, though you won't see it being carried. Another useful object is the blue ruby. If picked up it will immediately kill the mummies in any room you enter. The last useful items you will find are the golden tablets themselves. They are scattered throughout the maze, with no clues as to their locations. They don't have any special powers but they do bring you that much closer to your goal of finding all four.

So things aren't too easy, several perils may be found in the rooms. Pits are probably the most vexing. Entering a room with a pit causes you to fall to the next level down. They don't really do you any harm, just frustrate you—unless you happen to fall in a pit on level 5. Pits here are bottomless and you will find yourself falling and falling forever and ever, with no end in sight. You are effectively dead and will be asked if you want to play again. Too bad. Note: If you enter a room with a pit nearby the message "I FEEL A DRAFT" will flash on the screen, warning you of any potential perils. Unfortunately, it doesn't say in which room (none of the messages do) so be careful and use your judgement in deciding which room is safe.

Mummies also walk about the tomb. They're probably the most dangerous creatures you can face. If you enter a room and spot the mummy fast enough you can either throw a magic knife at it or flee. But most of the time you're too close to do either and you get killed. The warning "I SMELL A MUMMY" will be displayed if a mummy is in a room nearby. Of course, if you have the blue ruby then you don't have to worry about the mummies at all—they're killed the instant you set foot in the room. Pretty good, eh?

Snakes can also be deadly, but rarely so. If you enter a room with a snake a simple press of the fire button (or the space bar) will launch a knife and kill the snake—providing it's not too close, otherwise you have to run. Most of the time you can easily outrun it. The warning message for snakes is "I HEAR SNAKES".

Last and least of the hazards are the ghosts. More of an annoyance than a threat, these mischievous creatures spirit you away to another room on the same level. Usually it is harmless, but sometimes they can deposit you in a room with a mummy. Even if it doesn't you still have to retrace your steps—sometimes across other ghosts. A ghosts supersedes mummies and snakes. Entering a room with a ghost automatically freezes you and the other creatures until it carries you off to another room. The message "GHOSTS NEARBY" warns you of the presence of ghosts.

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C-64/VIC 20/PET/CBM OWNERS

Other Features

SKILL LEVELS: Upon loading the game (a couple of minutes with disk, 15-16 minutes with tape) you will be asked what skill level you want to play at (1-10). Levels 1 to 9 are all preprogrammed with differing numbers of hazards but level 10 lets you choose how many of each you want. After deciding, you will be asked if you want moving mummies. A yes here means that any mummies in the maze will continually wander throughout the rooms and you won't know where they will show up next. It makes the game harder, but also a bit more exciting.

SAVING A GAME: In my opinion this is one of the best features of the game. Having the ability to stop and save the game on disk or tape to continue later on where you left off is a great feature. It is useful in case something unexpected comes up or the game takes longer than you thought and you simply have to stop. It also makes it easy to "cheat": if you mess up in a game you simply reload the saved part and continue from there, sort of like having a backup. Useful.

Documentation

The program comes with an eight-page manual that explains how to load and play the game and gives a bit of strategy on how to finish. It is quite sufficient and I cannot see anything else that could have been included in it. (In case you're wondering, both disk and cassette come with a backup copy of the program.)

Strategy

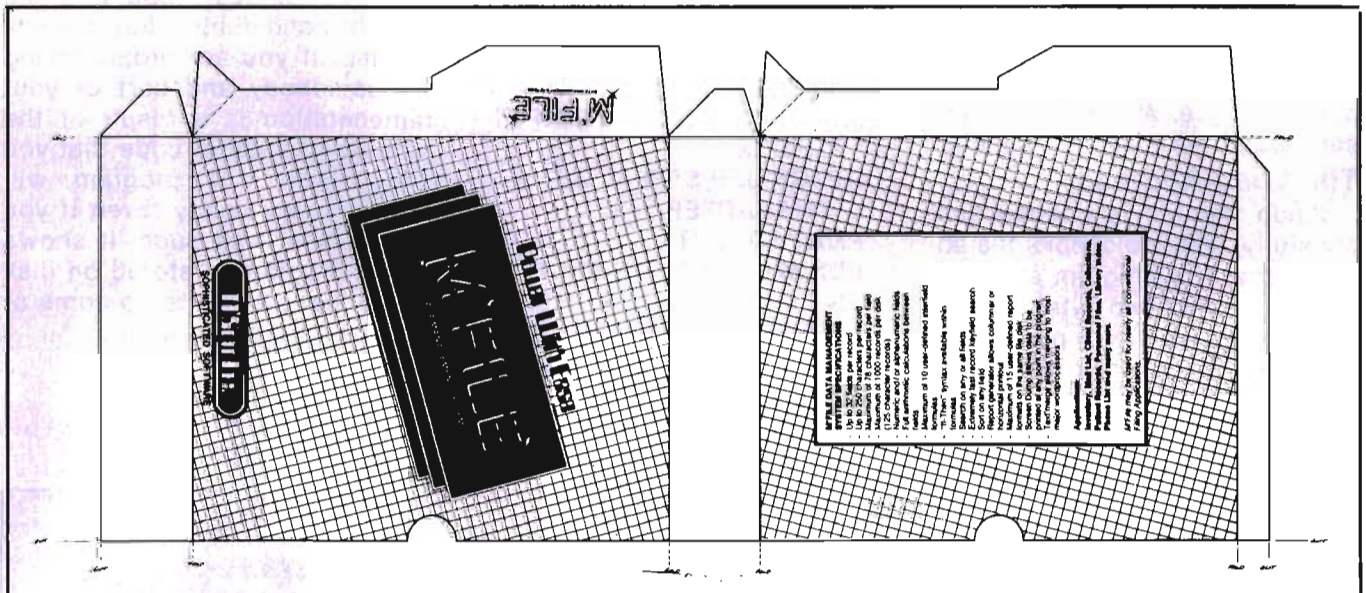
The best strategy for Robbers of the Lost Tomb is to scour every room and keep a map of each level. The latter is very important. Keeping maps allow you to avoid hazards, know where you've been and find the quickest way out when you have the last tablet. It doesn't matter how you keep your maps as long as they are decipherable. Apart from this there is really no other specific advice on strategy that I can give you.

Finishing the Game

Once you've found the fourth tablet you must make your way as quickly as possible to the entrance on the first level and climb out. You will then see yourself walk out of the tomb at night, jumping for joy. Congratulations are given, your time in hours, minutes and seconds is displayed, and you are asked if you want to play again. It's a proud feeling when you make it out, but I guess you always feel that you can do it better, in less time. Time to try again.

Recommendations

Robbers of the Lost Tomb is a game I heartily recommend for any Commodore 64 owner. Timeworks Inc. has produced a piece of quality software and I hope they continue to do so. I give this game a 10 out of 10 rating.□



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Circle No. 67

Count Lines: A Utility You Can Count On

by Howard Rotenberg

The program count lines is a fairly simple one that may only be needed once in a blue moon. I have had the need for many reasons to use it quite often though, so I thought that I might pass it on to others who might find it useful. The title of the program explains exactly what it does, COUNT LINES. It is used to count the number of lines in one or a series of BASIC programs. It counts the lines from the programs on disk. I will briefly explain how the program works.

Initialization:

Line 70 pokes a small machine language subroutine into the first cassette buffer that will scan through a program line after its number has been picked up. Lines 80 through 190 get the number of programs to work on, their names, drive number, and output device. A few strings are set up and the files are opened.

The Load Address:

When the file is opened successfully, line 200 checks the address that the program starts at. This is the first two bytes that are stored on a disk for a program. If it is not 1025 on any CBM computer that preceeds the VIC then it is not a BASIC program. At this point it closes that file and informs you that the program is not in BASIC, so no lines are counted.

The Link Address:

The next two bytes are the link address to the next line. This is picked up in line 270. If this number is zero then we know that we have come to the end of the program and we close the file and put the number of lines counted into an array. This information will be displayed or printed at the end of the program.

The Line Number:

The next two bytes that are picked up in line 330 are the line number. In this line we print out the line number just to show that the program is working. We also count the lines at this point. I have always added N$ which was defined as CHR$(0) at the beginning of the program for the following reason: if you try to print out an ASC value that is zero, you will get an illegal quantity error. Since there are very likely to be many zeros in the line numbers or links, the CHR$(0) allows us to display them.

Machine Language:

The small machine language subroutine in line 400 is used to quickly get through the rest of the line. The actual code used is:

```
LDX #$01 ; GET THE FILE
  NUMBER
JSR $FFC6 ; SET THE INPUT
  DEVICE
GETCH JSR $FFE4 ; GET A
  CHARACTER
PHA ; SAVE IT
LDX $96 ; GET THE STATUS
BNE OUT ; IF NOT 0 THEN
  GET OUT
PLA ; RESTORE CHARACTER
BNE GETCH ; NOT END OF
  LINE—GET ANOTHER
OUT RTS ; RETURN TO BASIC
```

The BASIC equivalent to this routine is as follows:

```
400 get#1,a$: if st    64 and
    asc(a$ + n$)    0 then 400
```

If you substitute this for line 400 you will see a significant decrease in speed.

The Finishing Touch:

The last part of the program just displays the program name, number of lines in each program and the time it took to count the lines. If you wanted to you could put an additional counter in line 440 to keep track of the total lines of all the program lines you have counted.

Conclusion:

As mentioned earlier, this program may not be needed very often but it beats counting the lines by hand if this information is needed. If you are programming for somebody and part of your remuneration is a result of the number of lines of code that you write, then this program will come in very handy. Even if you do not use it as such, it shows how a program is stored on disk and will allow you to do some of your own experimenting.□

```
10 REM
20 REM ************************
30 REM *       COUNT LINES     *
40 REM *   BY HOWARD ROTENBERG *
50 REM ************************
60 REM
70 FOR J=0TO17:READA:POKE634+J,A:NEXT
80 INPUT"HOW MANY PRGS TO WORK ON";P:DI
MF$(P),L2(P)
```

To be continued on page 130

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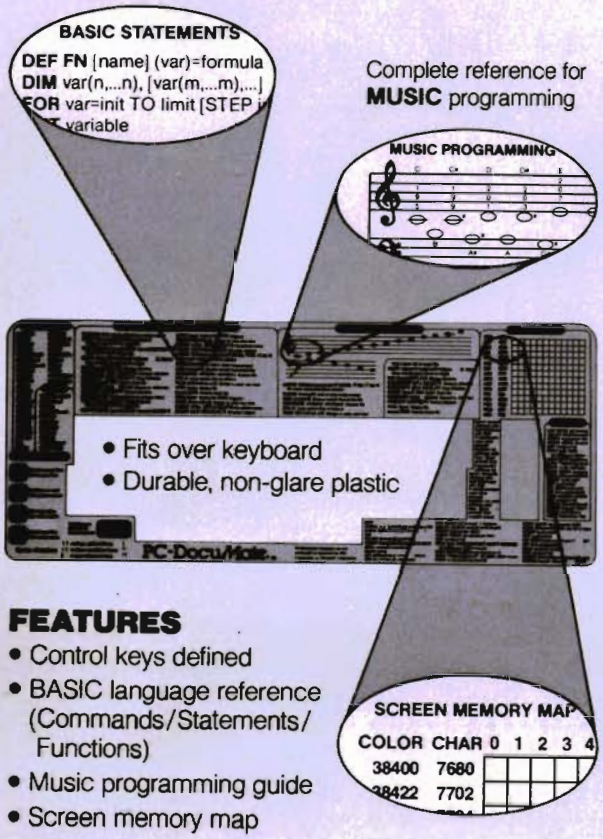
BASIC statements and options are documented



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Continued from page 128

```
90 FORJ=1TOP:INPUT"PROGRAM NAME";F$(J):
NEXT:I=1
100 INPUT"DRIVE";D :N$=CHR$(0):N=0:R1$=
CHR$(18):R2$=CHR$(146):DV=3
110 INPUT"SEND FINAL OUTPUT TO CRT OR P
RINTER   C[LEFT][LEFT][LEFT]";DV$
120 IFLEFT$(DV$,1)="P"THENDV=4
130 TI$="000000":FOR#1,(F$(I)),D(D):IFD
STHENPRINTDS$:NEXT:GOTO440
140 REM
150 REM ****************************
160 REM *    CHECK LOAD ADDRESS    *
170 REM * AND ABORT IF NOT BASIC *
180 REM ****************************
190 REM
200 GET#1,A$,B$:K=ASC(A$+N$)+ASC(B$+N$)
*256:IFK<>1025THENNEXT:GOTO430
210 REM
220 REM ****************************
230 REM *    CHECK LINK ADDRESS    *
240 REM * AND QUIT IF END OF PRG *
250 REM ****************************
260 REM
270 GET#1,A$,B$:IFASC(A$+N$)+ASC(B$+N$)
=NTHENNEXT:GOTO440
280 REM
290 REM ****************************
300 REM *    PRINT LINE NUMBER     *
310 REM ****************************
320 REM
330 GET#1,A$,B$:L=ASC(A$+N$)+ASC(B$+N$)
*256:PRINTL,:L1=L1+1:REMLINE
340 REM
350 REM ****************************
360 REM *   SCAN THROUGH REST OF   *
370 REM *    PROGRAM LINE IN ML    *
380 REM ****************************
390 REM
400 SYS634
410 REM
420 GOTO 270
430 PRINT F$(I);" PROGRAM STARTS AT"K:P
RINT"IT IS NOT A BASIC PROGRAM"
440 PRINT:PRINTL1"LINES":L2(I)=L1:T$(I)
=TI$:I=I+1:IFI<P+1THENL1=0:GOTO130
450 OPEN4,DV
460 PRINT:FOR K=1TOP:PRINT#4,R1$F$(K)R2
$;SPC(17-LEN(F$(K)))" HAS"L2(K)"LINES";
470 PRINT#4," AND TOOK ";MID$(T$(K),3,2
);" MINUTES AND "RIGHT$(T$(K),2);
480 PRINT" SECONDS TO COUNT.":NEXT:CLOS
E4
490 DATA162,1,32,198,255,32,228,255,72,
174,150,0,208,3,104,208,244,96

READY.
```

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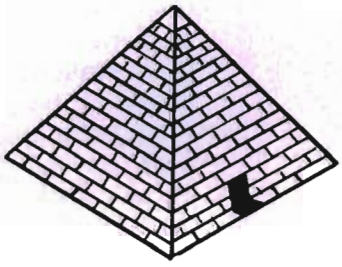

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Circle No. 13

Educational Reviews

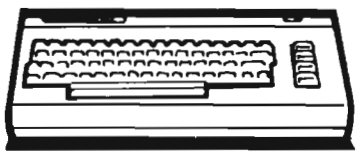
by Maryanne Dodd

Introduction

Summer vacation is over. September is here and another school year is just around the corner. Whether you are a veteran with the computer or you are just taking the plunge into the murky waters of computer learning you will find some useful software in this month's column.

At the beginning of the year students will be starting to program in BASIC. For the young elementary student there is COMMODORE'S GORTEK AND THE MICROCHIPS. For the more mature person I have THE ELEMENTARY COMMODORE 64 by William B. Sanders from DATAMOST.

For those preparing lesson plans for the new year I have from GREENWOOD SOFTWARE, GENESIS, a computer assisted authoring program. To keep track of the lessons and to aid in doing research I have TOTL'S RESEARCH ASSISTANT 2.0 which turns your computer into an advanced automated index for "3 x 5" filing cards. Then last of all I will comment on a products resource guide for the COMMODORE 64 called WHAT'S FOR THE '64 by Richard V. Mucci.



GORTEK AND THE MICROCHIPS COMMODORE 64 Cassette Commodore $24.95

When you think of kids and computers, what is the first thing that comes to mind? Space games of course! With this in mind COMMODORE designed a space adventure game for ten to thirteen year olds called GORTEK AND THE MICROCHIPS. Gortek is a robot that trains a cadet corps known as Microchips to program a computer called Creativity. The Microchips must program Creativity in order to save the planet Syntax from Zitrons who are intent on destroying every planet but their own.

Coincidentally while the planets are being saved the youngsters are being introduced to programming.

Games Mixed With Programming

The two cassettes are accompanied by a full color forty two page book. Intertwined in the story are directions for using the computer and programming in BASIC. The student begins by reading a few pages in the manual then is prompted to load from the cassette a game that reinforces skills presented in the text. An example of the game is ANNIHILATION. The student attempts to wipe out all of the letters the Zitrons are firing. ANNIHILATION is a good keyboard familiarization drill. Another game is called BOXES. To play this the student must be able to sort strings and variables.

Introductory Knowledge

After a student has finished GORTEK AND THE MICROCHIPS he will be able to wear the "I PROGRAM WITH GORTEK" badge. He will also be able to use the computer and have an introductory knowledge of BASIC. Some of the concepts learned include: list, writing input and output statement, introduction to string variables, goto and for next loops.

I would recommend GORTEK AND THE MICROCHIPS for the younger students. I am fascinated by the novel approach that the authors, Heather Scott, Stuart Alexander and Gary Bowie, used to design GORTEK AND THE MICROCHIPS for introducing children to the computer.

THE ELEMENTARY COMMODORE 64
William B. Sanders
DATAMOST
$14.95

Chalk up another winner for Datamost. ELEMENTARY COMMODORE 64 introduces in plain English the Commodore 64 computer. The book is written for the beginner. I knew I liked William Sanders when I read his philosophy in the preface. He feels that to use computers you don't need to know everything about how they work. After all, how many people learn how to drive a car and do so for a lifetime without understanding the internal combustion principle of the automobile. With this in mind Sanders has written a book for the person that wants to learn how to work their Commodore 64 computer and to program in BASIC, not build a computer.

Terms Are Defined

The ten chapters each start with an introduction followed by the text and then a summary. Before a computer term is used in the text it is defined. The author does not assume that the reader knows anything about computers. I think having the terms defined is an asset because it eliminates doing one of two things. Reading and thinking that you understand the technical terms when you don't or sitting with a dictionary or reference guide and looking up each new term.

Beware of Rundy

Interspersed throughout the book are paragraphs outlined with rectangles. Written within the rectangles are hints and tips on programming and common errors that beginners most often make. These tips are written in a very light manner that is often humorous. For example, "The Parentheses Dungeon" is the title of one block Sanders uses to explain how math operations are performed within the parentheses. In the analogy the prisoners are the math operations. The parentheses are the cells. The prisoners must break out of the inner most cells first. All math operations are executed—so the prisoners die while escaping. Sanders also cautions the reader to watch out for "Rundy". "Rundy" occurs when run is typed over the ready prompt. "Rundy" is a common error of people who are familiar with other computers.

The illustrations in the book are cartoons with a style very similar to the political cartoons found on the editorial pages of newspapers. The cartoons are very clever and emphasize either a point or a common misconception.

Computer Does Not Bite

The first chapter starts out assuring you that the computer will not "bite". It is to be used the same as any other piece of electronic equipment "with care but without fear". Sanders really starts at the very beginning by describing hardware, then telling the user how to hook it up and then turn it on.

The chapters and materials following are arranged in sequential order so that the user does not have to skip around in the book or refer to another section for special applications or more information.

For Those Afraid of Math

Since a lot of people think they would not be able to program because their math skills are undeveloped, one chapter is devoted to the Commodore 64 memory. ASCII values, CHR$ functions, POKES and PEEKS are introduced in a way that people who are afraid of math are not intimidated by binary numbers and algorithms.

Another chapter introduces screen and sprite graphics. The user is given some simple applications and there are suggestions for exploring more difficult animation and creating some original demonstrations and saving them.

Hints and Helps

The final chapter in the book presents some hints and helps. It covers user groups, publications, languages, and programming tricks not previously covered. Sanders also discusses some of the ways the Commodore 64 can be used—word processing, data base programming and business applications.

ELEMENTARY COMMODORE 64 is an excellent choice for someone that is thinking of buying a Commodore 64 or has recently bought one and is having difficulty using it. Even though the book was written for adults, the style is straightforward and simple enough that the book could be used by students as young as junior high school.

GENESIS
PET, 8032
Commodore 64
8K VIC 20
5K VIC 20 (Abbreviated)
Disk or Cassette
$20
Greenwood Software

GENESIS is a computer assisted instruction (CAI) authoring system that allows parents or teachers to prepare their own lessons for drills or evaluation. It can be used to create any instructional program that asks questions where there are one or two word definite answers.

GENESIS is well documented and user friendly. The program is menu driven. Lessons are pre-

pared by choosing options on a master menu. Upon loading GENESIS the instructor is given the choice of: title, instructions, questions, edit, new, format, run and save.

Format Options

After preparing the lesson there are several choices for the format of the lesson to be presented. The questions may be presented in random order with a time limit for the exercise or sequential order with the questions presented in sequence. The questions may be presented in lowercase, capitals or uppercase. Another feature of the format section is the capability of formatting the lesson so it will allow the students to type their name at the beginning of the lesson. The computer then records the number of questions attempted, number correct and the percentile. The computer will accept a class list of up to thirty names.

GENESIS is designed so that the students do not see the master menu nor do they have access to the scores of other members of the class. If the students do learn how to enter the menu the code words can be changed.

Complete Documentation

The manual accompanying GENESIS is complete and even gives examples of lessons that can be prepared. The program can be used by people that have no previous programming experience. For the more experienced programmer, technical information containing the program outline and a list of the string variables are contained in the manual. This allows the program to be modified and fit unique situations or individual needs.

Lessons prepared with the program are pure CAI. There are no graphics involved. There is a positive reinforcement consisting of the word "correct" flashing on the screen accompanied by sound when the proper response is entered.

Utilization

I feel that GENESIS would be beneficial to parents and teachers that want to create unique and individualized lessons. The lessons could be tailored to a particular remedial need or they could be presented sequentially to gradually introduce new material. Lessons requiring drill or rote memory would be particularly suited to GENESIS especially with the questions presented in random order.

RESEARCH ASSISTANT
COMMODORE 64
Cassette or Disk
TOTL
$35.00 Tape
$39.00 Disk

With September here and school starting there are new beginnings and papers to be written. If you own a computer you no longer need to file your information on those bulky "3 x 5" cards which tend to get dog-eared, smudged, or even worse, the rubber band breaks or the box spills and you have instant chaos.

Specialized Data Base

RESEARCH ASSISTANT 2.0 by TOTL is a specialized data base system. It takes the place of the "3 x 5" file cards and stores information from books, journals, magazines and newspapers on tape or disk. It sorts and searches on the basis of keywords and data ranges. Then, it will print out detailed source and reference data. A printer is required to take full advantage of all the features of the program.

Contains Two Programs

RESEARCH ASSISTANT 2.0 contains two programs: RA. BUILD AND RA. XREF BUILD. RA. BUILD allows the user to enter reference data and to print both reference and cross reference data files in order to produce a permanent copy for easy reference.

RA. XREF BUILD reads data files created by RA. BUILD and creates a cross reference list in sorted keyword order. With RA. XREF BUILD inquiries can be done on combinations of keywords, dates, or information can be saved to disk or tape to be printed later.

RA. BUILD

RA. BUILD is menu driven. The choices given on the main menu are: new file, update/append file, change I/O, print RA. file, print RAX. file and quit.

When you first choose *new file* you will be able to build reference records. Each reference record is like a"3 x 5" card. Each card is given a reference number from 1 to 9999. The next item on the card is *pages. Pages* accepts free form data of any notation up to 40 characters in length. Next we see *comments*, which is the body of the notes. In this section, data up to 1020 characters may be entered. The last section is *keywords*. Each reference may have up to twelve keywords forty characters long. If the data is time sensitive a beginning and ending date may be entered.

Update/append file can only be used if a disk drive is used for input and output. Existing records may be updated or new files may be inserted.

Another option allows you to change your input/output option (I/O). This is for changing devices from disc to tape. The main menu also allows printing the RA. files and the RAX. files.

RA. XREF BUILD

The RA. XREF BUILD program is also menu driven. The options available are: set dates/new XREF. BUILD, save XREF. load XREF. inquiry and quit.

Set dates/new XREF. is designed to clear all keyboard data currently in memory and to allow the user to do the necessary setup before building the cross reference table. Up to twenty date periods, each defined by its ending date may be entered.

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Circle No. 100

BUILD XREF. adds data to the cross reference table in memory from the RA. file. The only limit to size is the amount of memory left in the computer.

Inquiry allows the user to interrogate the cross reference table in memory. One or several keywords or dates are entered and then the source number and reference number of any reference which contains all the keywords and date periods will be displayed.

Documentation

RESEARCH ASSISTANT 2.0 is very well documented. Prior computer knowledge is not necessary. This program could be the user's first experience with the COMMODORE 64 and there would be little difficulty encountered. The manual even explains how to format and initialize disks and how to use the program with a printer other than the COMMODORE printer. The programs are written in BASIC; therefore backups and modifications can be made without difficulty. The manual suggests some modifications that the user might want to make to suit his individual needs.

TOTL Support

One quality that really impressed me in this software package was TOTL's support to the registered owner of the package. If a problem is encountered or the user desires technical assistance TOTL offers to provide help with only $2.00 for postage and handling required. If the user has made modifications it is requested that a disc/tape with the modifications be enclosed. Having struggled with programs that didn't work or contained bugs, I really appreciate a company that offers this kind of service and actually advertises it in their manual.

RESEARCH ASSISTANT 2.0 could be used by those doing original research or writing papers. It could also be used by anyone that needs to catalog collections or cross reference information. As a teacher I would find RESEARCH ASSISTANT particularly useful in indexing materials used when preparing new units or organizing supplies.

WHAT'S FOR THE 64
Richard V. Mucci
Commodore 64
$15.00

WHAT'S FOR THE 64 is a products resource guide for the COMMODORE 64 computer. With the sale of computers by the mass merchants there are quite a few people with a COMMODORE 64 and no idea of the support offered or software and peripherals available. Richard Mucci was in this predicament a short while back. He decided to gather all the diverse and nebulous information into an ordered and meaningful file for the COMMODORE 64. After compiling all the information, Mucci decided that he would share these resources with others in the form of a book.

What's In The Book

In the book WHAT'S FOR THE 64 you will find listings of: software; enablers (compilers, emulators, interfaces, etc.); peripherals; books, magazines and periodical articles; user groups and sources.

If you are new to the COMMODORE 64 the index of periodical articles written for the 64 and the lists of magazines and books supporting the 64 would be particularly useful. Both oldtimers and newcomers will find the directory of sources which contains addresses and phone numbers very helpful.

A Living Resource

Another interesting feature of the WHAT'S FOR THE 64 is that Richard Mucci envisions the book to be a living source which will grow with the COMMODORE 64. Addends and supplements will be published and readers are asked to participate with input and suggestions.□

Reviews for the C-64

Meteor Madness
Rated ****
by R. G. Partner

Are you ready for many hours of excitement? If you are, then Meteor Madness is for you. Are you ready for a real challenge? Then Meteor Madness is just the game to keep you on the edge of your chair! Get a co-pilot or two; in fact up to FOUR people can play this one. After loading this DISK game, you find yourself in outer space, miles above earth. Suddenly you are confronted with the absolute blackness of space, in front of you is a gun sight cross-hair, your thumb rests gently on the fire button of your Nuclear Powered Laser. You are in control of robot drone ships. All you can see in the blackness of space is the light from hundreds of stars. Somewhere out there are huge clusters of deadly meteors headed toward civilization. You wait, uneasy, knowing the danger you're confronting. You MUST protect earth at all costs. You scan the view screen, nothing, nothing but stars, but wait, as you watch several seem to get larger and larger until you realize THIS is one of the METEORS which will destroy earth if you don't get it first!

The screen begins to fill with METEORS, different colors and sizes moving in different directions. If you have a quick hand and a quick eye you can bring the cross-hair of your NUCLEAR POWERED LASER CANNON to bear on a meteor; there, it's centered in the sight, NOW push the fire button. The meteor is destroyed! But look out, there is a large one moving in on your ship! Swing around quick! Fire! Fire! Wheeeewwww, almost missed that one! There are more coming, you must complete your mission! Life on earth depends on it! Good luck!

This is just level ONE of many levels. Then there are the CHALLENGE levels. Each one more difficult than the one before. Points gained for blasting the meteors vary with the size of the meteor. Very small meteors count more than medium sized ones and very large ones count almost as much as the very small. The large meteors (large enough to fill your laser sight) count bonus points. That is because they are about to explode and if you happen to have your laser trained on one when it explodes IT'S ALL OVER FOR YOU!!

As you go from level to level there are more meteors and they get larger quicker so you must be faster with moving the laser cannon on target and firing. My son and I have gotten to level 8 and that has been a real challenge.

This game created by SOFT-PLUS in Lawrence, Kansas, should keep anyone who enjoys a challenge occupied. Be prepared to lose some games in the beginning however. If you are patient and improve your skill you can advance on to the next level. I don't know how many levels there are so let us know how you are doing. Remember EARTH MUST BE PRESERVED AT ALL COSTS... THE METEORS MUST BE DESTROYED!!□

Tyler's Dungeons
Rated ****
by R. G. Partner

From Creative Equipment in Miami, Florida comes the first 3-dimensional graphic cartridge game. All machine language for fast action, this combines the fun

of the 'ADVENTURE TYPE GAMES' with the excellent graphics of the C-64.

Two hundred and fifty rooms (that's right 250) to search through while looking for eight treasures. Now that sounds easy enough, right? Let me tell you that you're in for a surprise. While looking for this treasure you must avoid surprise cave-ins!

Yep, there you are hurrying through a room and all of a sudden it caves in and you find yourself trapped in a little tiny space with no place to go and running out of air.

If that's not enough to keep you from playing, how about SNAKE PITS! I thought that might do it!! Yes, there are snake pits and worst of all you don't know where they are or when they will appear! You cannot see them until suddenly you are confronted with a SNAKE! Now I don't mean some dinky slithering snake. This is a BIG snake with fangs and everything and it seems that you are his favorite attraction. Some rooms have snake pits and you can enter the room and look around but trying to exit is a different matter. Not easily done!

Oh, I didn't mention the LURKS, did I? Let's see....no, I guess I didn't. Well, let me tell you about LURKS! There is one Lurk in each of the two hundred fifty rooms. That's right, two hundred and fifty LURKS. They are the keepers of the rooms and they are indestructible! It does not matter what you do, there is always a LURK following you, always pursuing. The snakes don't stop him, the cave-ins don't stop him. Nothing stops him. A LURK'S touch is deadly, so be careful!

I guess I didn't mention elevators yet. The dungeon is made up of four levels. To travel from level to level, you must find the elevators. An elevator looks like a small checkerboard section. Which one goes up and which one goes down? I will let you figure that one out. I will tell you that a DOWN elevator will transport you to the next lower level. There will not be an UP elevator directly underneath or vice versa. One more hint, make sure you have thoroughly explored the level you are on before entering an elevator.

** Treasures ** Treasures

If you manage to evade the dangers and acquire all eight treasures, A SPECIAL MESSAGE will appear on the screen. Following those directions will make you eligible for a random drawing on April 1, 1984. The ONE winner will receive $500.00 for his or her efforts. NOW THAT'S WHAT I CALL REAL TREASURE!!

Good luck with the game.

P.S. I'm still trying to find a way out of one of the snake pit rooms .....they just don't want to let me through.....and.....oh, no, here comes a LURK ..... hhhheeeeeeelllllppppppp!□

FROGGER

by Eric Giguere

Author: Chuck Benton

Available from: Sierra On-Line, Inc., 36576 Mudge Ranch Road, Coarsegold, CA 93614

For use with: Commodore 64 (disk or cassette)

If you're a person who likes to frequent arcades then you probably noticed the game FROGGER a few months back. This "cute" game with its enchanting graphics and catchy soundtrack is now available for the Commodore 64 as an official licensed version from Sega. Produced by Sierra On-Line, Inc., FROGGER is the best arcade game that I've seen for the C64. Smooth, colourful graphics and a faithful reproduction of the soundtrack make this game a must for C64 owners.

Description

The basic idea behind FROGGER is very simple: jump your frog across the highway, through the river and into one of his "homes" before the clock runs out. Life isn't easy for the poor frog, though. The highway has a steady stream of bulldozers, race cars and trucks driving across, usually at high speeds. Careful timing here is a must if Herbie (my nickname for the frog) is to survive and attempt the river. If he does survive he may rest a while on the river bank, although watch out for roving snakes at higher levels! Crossing the river is the hardest part of Herbie's act because, strangely enough, Herbie cannot swim in the river. I assume this is because the river is polluted with some poison deadly only to frogs. In any case, Herbie must instead use the floating logs and swimming turtles, jumping from the back of one onto the back of another. He may then jump into one of his home bases, finishing (for awhile) his ordeal.

Each time Herbie makes it to one of his home bases he leaves behind an image of himself (his way of saying "Herbie was here") and starts all over again at the bottom. If he succeeds in visiting all five bases Herbie advances to the next level where there are five new, empty lairs and faster hazards. Ah, well! No one said that being a frog was easy...

Loads of Features

FROGGER could have probably been an average game if it didn't have any special features. What makes it stand out from the crowd are the options. You can select between a SLOW mode and a FAST mode depending upon your skill. If you are using the keyboard you can choose which keys you want to represent up, down, left and right, a pretty nice feature. Another option is the ability to shut off the background music, leaving Herbie's leaps as the only sound heard. Something I really like is the pause feature which enables you to freeze the game if you need to take a break or answer a phone call. This ensures you don't have to blow a perfect game because of a useless distraction.

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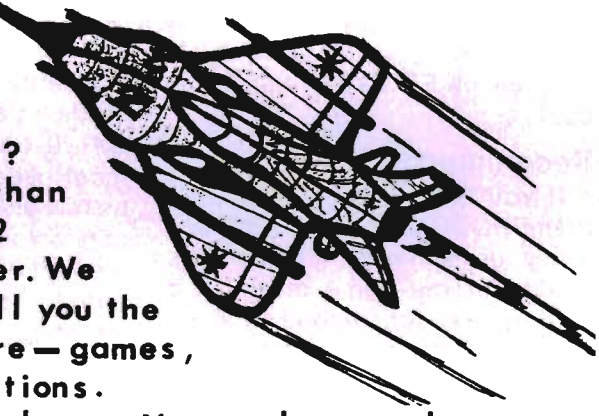

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The graphics on FROGGER are what I would call superb. The background objects like the logs are finely detailed, beautifully coloured and smooth-scrolling. The frog is a sprite (an albino—it's white) and there is absolutely no flicker whatsoever when it moves. Sometimes I just sit there and stare at what's passing on the screen, or I just sit there listening, I'm so impressed. The background music must be heard to be believed. It makes full use of the SID chip inside the C64 and reminds me of the arcade version itself, it's so good. Good music and charming graphics are another reason FROGGER is a super deal.

Recommendations

If you like arcade-style games then FROGGER is a definite must for your software library. The quality of the game makes it a sure winner for anyone. It's the best game I've seen so far for the Commodore 64. My advice: get it.

A Review of John F. Zacharias' L. D. Menu Program For Commodore Computers

by Lanny Hertzberg

One of the more frustrating things for teachers who use microcomputers is trying to find the right title of a program on a disk, so that you can load it into the computer. When you have students who are unfamiliar with the workings of computers, and yet want to use those programs as well, it can turn into a nightmare.

I teach Computer Science in a high school in the Elk Grove School District (south of Sacramento). I have a lab of 20 Commodore 64's with both individual disk drives (VIC 1541s) for each computer as well as a networking system (Commodore 8250). I have over 5000 programs, 700 of which I use with some regularity. Because many of my students are using computers for CAI, it was necessary to put the most used programs together on as few disks as possible (thus the networked 8250). Commodore's method of letting you get a directory (or catalog) is to load the directory as a program and then list it. The list then scrolls down the screen the same way a program would. If you want to stop the list before it finishes, you can, but you cannot back the list up. The user then has to load the program by typing the load command followed by an exact name of the program. A missed space, comma, colon, whatever will all result in a "FILE NOT FOUND" error.

A program that would list your disk directory one page (screen) at a time, let you go back and forth from page to page, and load a program by just typing the number in front of the program would be a boon. Such programs exist; they are called MENU programs, because they are similar to restaurant menus. Unfortunately, every one I have seen has been written in BASIC and suffers from four faults:

1. They are slooowww.
2. They only work on one type of computer and/or disk drive.
3. They will not work for any device number other than 8 (Commodore uses "intelligent" disks that have device numbers, typically number 8. The computer can be hooked up to as many as eight disks at the same time numbered from 8 to 15.)
4. They usually store their directory information as data files, either within the program or as a sequential/relative file on the disk. Both of these options take up disk space and require a periodic "updating" of the file to keep the directory accurate.

The L. D. Menu program takes care of all those problems, plus has some nice additional features. It is written in machine language, so it is fast (10 seconds to load a 200 program directory from the 2 megabyte floppy disk). It will work with every Commodore computer, including the VIC, except for the original 1.0 rom PET. It will work with any Commodore floppy disk drive, with the drive set to any device number from 8 to 15. In fact it will read all 8 drives at once, if you have such hooked up to your computer. It does not store the directory as a file on the disk or in the program. Instead it reads the disk directory directly and stores it in a buffer in the computer, displaying it in a 14 program page.

The additional features include the ability to "hide" programs (make them not appear on the menu) by placing an exclamation point as the first character in the name. The menu program itself is unlistable, so you don't have people using the menu to load the menu ad nauseum. You can reload the menu from within the program (so that you could replace a disk and read the new directory) by pressing the equal sign. Programs may be booted (loaded and started running) or just loaded. Machine code programs can be loaded into their proper memory location also from the menu.

The cost is a reasonable $20.00 for the program and a very comprehensive manual. Further information can be obtained by writing: John Zacharias, 10004 Vanguard Drive, Sacramento, CA 95827.□

News Releases

Computer Media Directory

A reference book for marketing communications and public relations personnel in the computer industry.

The first section of the directory includes listings of computer media and allied publications such as those concerned with office automation, word processing, office equipment and data communications.

Included are the names of top editors, reporters or editors responsible for specialized categories of subject matter, bureau chiefs and correspondents in other cities. Direct telephone numbers and addresses for offices outside the headquarters are provided as available.

Computer Media Directory also carries a section listing computer editors or special reporters on major daily newspapers and general and business magazines, as well as feature and news services.

A third section, which will be expanded in updates and future editions, lists accredited free-lance writers whose computer-related articles have appeared in established publications.

Cost of the directory is $99.95, or $149.95 with quarterly updates. Orders and additional publication and free-lance listing can be placed with Computer Media Directory, 2518 Grant Street, Houston, Texas 77006.□

N.E.C.L.

The National Educational Computer Library is calling for papers on behalf of an educational computer conference it is sponsoring on November 5, 6 and 7 of 1983 at the McCormick Inn in Chicago. The conference proceedings and papers will afterwards be published and made available to any interested party. All interested speakers should submit a brief outline of their proposed presentation. For further information contact the: National Educational Library, P.O. Box 293, New Milford, CT 96776, Telephone 203-354-7760.

In addition to the seminars this major educational conference will feature exhibits, hands on demonstrations and workshops. The National Educational Computer Library is a non-profit educational organization which seeks to promote learning and education in grammar and high school students through the use of computers and educational computer programs.□

Micro Software International to Distribute Software Arts Products In England, Europe

MicroSoftware International of Newton, Upper Falls, Massachusetts, the marketing and distributing firm recently formed in the U.S. by Robert Shapiro, has announced that it will be the exclusive distributors for Software Arts programs in Great Britain, France, Germany, and the Benelux countries.

The announcement comes after several months of negotiation between MicroSoftware International and Software Arts. TK Solver™—Software Arts' highly acclaimed equation-solving program for the IBM/PC, will be the initial program marketed overseas by MSI.

According to MSI's Executive Vice President Shapiro, "We foresee a bright future for Software Arts in the European business market. We are augmenting the distribution with marketing and advertising backup, and project that the product will be on Euro-

pean store shelves by June 30, 1983."

In addition to Software Arts, MSI also is the worldwide distributor for Computer Software Associates products.

Additional information can be obtained by contacting Micro-Software International, Inc., The Silk Mill, 44 Oak Street, Newton, Upper Falls, MA 02164; telephone (617) 527-7510.

European inquiries can be directed to Marketing Micro Software Ltd., Goddard Road, Whitehouse Industrial Estate, Ipswich, Suffolk, England; telephone (0473) 462-721.□

PRACTICALC 64 WINS BIG AT CONSUMER ELECTRONICS SHOW

PractiCalc 64, the spreadsheet program from Computer Software Associates garnered an impressive "win" at the Summer Consumer Electronics Show recently held in Chicago. PractiCalc 64 was singled out as the **only** program in the Home Management category in the CES Software Showcase to be worthy of citation. The selection was made by a panel of six judges, who are editors in the computer industry.

In all, there are nine software categories: the aforementioned home management, word processing, education, adventure, arcade, maze, space, strategy and "other". A total of 62 prizes were awarded from over 180 entries. The competition was open to software written for all computers, and only five other awards were presented to publishers of Commodore 64 software.

"Although PractiCalc 64 is written for the Commodore 64, its 'sister program', PractiCalc Plus has clearly been recognized as the most powerful spreadsheet program for the VIC," says Sandy Ruby, author of the PractiCalc series and President of Computer Software Associates, "and the award for the '64' version confirms that as well for '64' owners. We're extremely pleased that our industry colleagues were so impressed with the program."

PractiCalc Plus and PractiCalc 64 are both spreadsheet programs that offer high- and low-resolution graphics, alphanumeric sort and search, as well as mathematical and trigonometric functions. Both programs are available in either cassette or disk version. Suggested retail prices are: PractiCalc 20 $39.95-cassette, $44.95-disk; PractiCalc Plus (for the VIC 20) $49.95-cassette, $54.95-disk; PractiCalc 64 (for the Commodore 64) $54.95-cassette, $59.95-disk.

Additional information can be obtained by writing to Micro Software International, Inc., 44 Oak Street, The Silk Mill, Newton Upper Falls, MA 02164; (617) 527-7510.□

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NEW PRODUCTS

THREE NEW SOFTWARE PROGRAMS FOR COMMODORE 64

Three NEW informative programs have just been made available nationally by TIMEWORKS, INC., Deerfield, Illinois, independent publisher of personal computer software. Created specifically for the popular COMMODORE 64 computer, these new programs are some of the eleven new TIMEWORKS' Commodore 64 programs.

The programs include THE ELECTRONIC CHECKBOOK, a check recording, sorting, and balancing system; DUNGEON of the ALGEBRA DRAGONS, an adventure-in-learning game which provides a challenging and enjoyable way to develop algebra skills; and PROGRAMMING KIT I, a practical "How-to" learning approach to basic programming. The package includes TIMEWORKS' exclusive eight-step approach to program design, easily and fully explained.

The caliber of programming (usually found in much more expensive programs) and the ease of understanding of TIMEWORKS' programs have proven outstanding in these four categories: Entertainment, Education, Programming and Home/Small Business. Suggested retail price of each program is $24.95.

Each program is packaged in attractive four-color boxes with an overview, and at-a-glance program parameters. And a compre-

hensive, easy-to-understand manual is included.

For further information write or call TIMEWORKS, INC., 405 Lake Cook Road, Building A, Deerfield, IL 60015, (312) 291-9200, TW #607.□

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PAL 64—PERSONAL ASSEMBLY LANGUAGE FOR THE COMMODORE 64

Written by BRAD TEMPLETON, author of POWER and other PET products.

PAL 64 is a new program for the Commodore 64 that allows you to easily write machine language programs. With PAL 64, you can type in machine language programs in symbolic form and quickly assemble them into real machine language for the computer to run. It was the first, and is still the fastest and most easy to use, assembler for your Commodore 64.

With PAL 64, you type your assembler program in with the standard Basic program editor that is well known to all Commodore 64 users. There is no change of environment and there are no new tricks to learn. Tools like POWER can be used to help in this task if desired. PAL 64 can work entirely from memory, taking a "source" program from RAM and assembling it into a running program in another area of RAM. These two abilities allow PAL 64 to be used with a minimum of fuss and a maximum of speed.

Although PAL 64 is fast and compact, it also is loaded with big assembler features, including:

1. Relocatable output with relocating loader
2. Conditional assembly
3. Loading and saving symbol tables from disk
4. User customization of output, pseudo-ops and expressions
5. File chaining for large programs

You can express your values to PAL 64 in all kinds of handy ways. Expressions can be highly complex, including parentheses. There are 7 different operators, and values can be given in decimal, hexadecimal, binary and several other methods. Symbols can be up to 8 characters long.

One of the best features of PAL 64 is the ability to produce programs that are a combination of Basic and machine language. With PAL 64, you can write a Basic program that calls machine language routines by their symbolic name, and PAL 64 will figure out the addresses for you, creating a program than can be LOADed and RUN. This is especially good for beginners who wish to start with Basic and move slowly to machine language, letting PAL

(Continued on page 146)

NUMERIC KEYPAD FOR COMMODORE-64 AND VIC-20

Computer Place introduces a numeric keypad for Commodore-64 and VIC-20. The keypad is designed with top quality, low profile key switches for smooth, reliable and low-cost data entry. It lets you zip through your numeric work sheet, input your numbers and figures comfortably, quickly, and more easily than ever before.

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Contact W. Huang of Computer Place, 23914 Crenshaw Blvd., Torrance, CA 90505/(213) 325-4754.□

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64 take care of the nitty-gritty.

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NEW SCIENCE AND ENGLISH EDUCATIONAL PROGRAMS

Pet

The Skeletal System, Word Functions, and **Classes of Nouns,** new science and English educational software programs designed to run on Commodore PET® computers and supplement classroom studies, are now available from BrainBank, Inc. All three titles, in 16K, represent BrainBank's high-quality courseware.

The Skeletal System contains five programs, each covering a different part of the system. They are entitled: "A Bone to Pick", "Major Skeletal Bones", "Joints, Ligaments and Cartilage", and a Review/Test. This title is the first follow-up to the popular BBI title: **The Human Body, An Overview,** which has received rave reviews for its fine graphics and student effectiveness. This follow-up title is equally well-crafted and exciting. **The Skeletal System** is available on disk or cassette for $70 and $32 each for back-up copies, and includes an extensive documentation package with line drawings and a Teacher Guide.

Word Functions is available on two disks or cassettes, containing a total of nine separate programs in two parts. Part I on one disk includes "Homonyms", "Homonyms Matching Game", "Synonyms", and "A Synonym Matching Game". Part II, on the second disk, includes "Antonyms", "More Antonyms", "Troublesome Words (to, too, two)", "Troublesome Words (it's, its)", and a Review/Test. This title contains a matching game in a maze format, wherein a sentence appears missing one word which the student has to find and correctly place. It can be played competitively between two players. **Word Functions** is available for $99 and $37 for each back-up set, and includes documentation and Teacher Guide.

Classes of Nouns helps teach recognition of common nouns, proper nouns and special classes of nouns. This user-friendly, interactive title is designed for high school English students. Its five programs are: "Proper Nouns", "Capitalization: Titles Are Tricky", "Special Classes of Nouns", "Common Nouns", and a Review/Test. With extensive documentation and Teacher Guide, **Classes of Nouns** is available for $60 and $22 each for back-ups on either disks or cassettes.

"The Skeletal System, Word Functions and **Classes of Nouns** have been designed to educate as well as offer fun and diversion," said Ruth Landa, founder and president of BrainBank. "The programs contain lively graphics, interactive features, and like all BBI BrainWare, are pedagogically sound."

Additional information on these three new BrainBank titles, as well as BBI's other educational courseware and games, is available by writing to BrainBank, Inc., 220 Fifth Avenue, New York, NY 10001, or by telephoning (212) 686-6565.□

POWER 64

A Commodore 64 programmer's utility package written by Brad Templeton with a comprehensive manual by Jim Butterfield.

Why Power 64?

—Power 64 produces a spectacular improvement in the ease of Basic programming on the Commodore 64. It is easy to learn and fast to use.

What Does Power 64 Do?

—Power 64's features include:

—automatic line numbering and re-numbering

—complete tracing functions

—single stepping through programs

—definition of keys as BASIC keywords

—de-bugging ease with a "Why" command

—addition of auto repeat function to cursor keys

—text search and replace functions

—ability to merge basic programs

—listing and scrolling up and down of BASIC programs in memory

—hexadecimal and decimal conversions

—and much, much more

How Does Power 64 Work?

—Power 64 contains a series of new commands and utilities which are added to the screen editor and BASIC interpreter. Using only 4K of memory, Power 64's collection of special editing, programming and software debugging tools are not found in any other microcomputer BASIC.

How Much Does Power 64 Cost?

—Only **$99.95**; from your Commodore Dealer.

HOW MUCH IS YOUR TIME WORTH?!□

MUSIC AND SOUND EFFECTS SYNTHESIS SOFTWARE WITH ALL GRAPHICS ENTRY AND EDITING

Two new programs, Note Pro I and Note Pro II, allow creation and play of music and sound effects on a treble clef musical staff. A third new program, Note Pro Bridge is a package for the beginner or experienced programmer. It is a set of copyable MACHINE LANGUAGE Programs which play Note Pro music/sound effect files and can be added to any program. End users can use Note Pro I or Note Pro II to enter and play music and sound effects. Programmers can use Note Pro Bridge to add music and sound effects to their entertainment or educational programs.

Note Pro II is loaded with uses and features. It allows you to enter or edit an eight measure section of music on each screen using a special five line musical staff. Each voice has a full eight octave range. Notes can be strung together to create note durations of unlimited length, or kept separate (staccato). Two-hundred and fifty-four gradations of tempo allow speeds ranging from one to four-hundred and fifty notes per second. ADSR, wave shape, and filter settings can be manipulated and saved. Best of all, Note Pro II allows you to ARRANGE your music independently of its actual sequence in memory. You can repeat sections, switch their order of occurrence, and even play music backwards! Note Pro II was field tested in a rock band which now uses it along with the 64 in its regular performances.

Note Pro I offers one measure of treble clef per screeen, two-hundred and fifty-five gradations of tempo, and control of ADSR and wave shape. Each voice is given a two octave range, providing you with bass, tenor, and soprano melody lines.

Note Pro Bridge provides the beginner or expert programmer with control over the SID chip that isn't possible in BASIC. Note Pro Bridge actually makes music and sound effects part of your computer's operating system. The programmer controls Note Pro

COMMODORE AUTOMODEM FEATURES PARALLEL PRINTER PORT

The Microperipheral Corp. has just announced a low cost modem for the VIC-20 and Commodore 64. The unit features both an autodial and autoanswer capability. In addition, it has a built in Centronics compatible parallel printer port.

The new product, called an AutoPrint-Microconnection, retails for $149.94 and is enclosed in a professional quality extruded aluminum case. It operates at 300 baud (Bell 103) in either originate or answer mode and is FCC Type Accepted. The combination modem and printer interface plugs directly into the computer without the need for additional interface devices. Telecommunications software is provided in the user manual.

The printer port permits connecting conventional parallel printers such as the Epson and Oki. With the modem connected to the phone line, the printer will simultaneously provide hard copy of whatever appears on the screen. Word processing software is available which routes text to the printer via the modem.

The unit measures 5" x 6" x 2" and weighs 2 pounds. For additional information, contact Norene Scott, Director of Sales, The Microperipheral Corp., 2565 152nd Ave. N.E., Redmond, WA 98052. Telephone (206) 881-7544.

NEW DEALERS

Massachusetts
Microcron Software Center
Woburn Mall
Woburn, MA 01801

LCA
679 Washington St.
Norwood, MA 02062

New Jersey
Software City
102 Cranford Road
Cherry Hill, NJ 08003

Software Center
372 Hwy 18
East Brunswick, NJ 08816

New York
Software City
187 Main St.
Mt. Kisco, NY 10549

Florida

Sunshine Software
956 NE 62nd St.
Ft. Lauderdale, FL 33334

Alabama
Software City
7771 E. Wood Mall
Birmingham, AL 35210

Illinois

The Book Baazare
Eastland Shopping Center
Bloomington, IL 61701

Computer Clinic
560 N. St. #203
Springfield, IL 61704

Texas
Microbase
8525 Stella Link Rd. #5
Houston, TX 77025

Video Rama
2425 Bay Area Blvd.
Houston, TX 77058

Computers Plus +
2350 E. Southcross Blvd.
San Antonio, TX 78223

Idaho
Friendly Computers
3655 Gov't Way Suite 5
Cour D'Alene, ID 83814

Utah
ICS
1700 N. State #21
Provo, UT 84603

Arizona
Copperstate Cash Register Co.
3125 E. McDowell
Phoenix, AZ 85008

California
Kens Computer & Video
263 S. Western Ave.
Los Angeles, CA 90004

Software Center
8324 Wilshire Blvd.
Beverly Hills, CA 90211

Access To Software
4720 Geary Blvd.
San Francisco, CA 94118

Oregon
80 Plus
4535 SE Soodstock
Portland, OR 97206

Rainy Day Bookshop
643 SE Jackson St.
Roseburg, OR 97470

Canada
Interactive Computer Systems
554 Queen Street
Fredericton, New Brunswick
Canada E3B 1W9

Now for the "64" **STCP** — 300/1200 Baud
Standard Terminal Communications Package

PFO IOD OOA CP<D1>D2 BELL = 12:30:00 10:14:36

Don't settle for non-standard Communications Protocol! Access Micro Net, Source, Bulletin Boards, Local Mainframe, etc.

- Complete Package — Includes RS232 Interface Board and software (does not include modem)
- Communicates in Industry Standard ASCII
- Upload/Download to/from Disk
- Automatic File Translation
- Can be controlled from keyboard or user supplied basic or machine language program

Specify 3.0 or 4.0 ROMS or 8032 Commodore Computer 4040 or 8050 or PEDISK II Disk or CBM64 on 1541.

Price: $129.95

ATARI AND PET EPROM PROGRAMMER

Programs 2716 and 2532 EPROMs. Includes hardware and software. PET = $75.00 – ATARI (includes sophisticated machine language monitor) = $119.95

Prowriter Printer - Excellent dot matrix print Parallel = $489.00 Serial = $600.00. IEEE = $589.00

NEW **VIC RABBIT CARTRIDGE AND CBM 64 RABBIT CARTRIDGE**

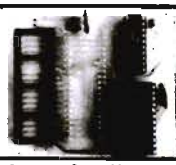
NEW FEATURE! DATA FILES!
"High Speed Cassette Load and Save!"
$39.95 (includes cartridge and manual)
for VIC

Don't waste your Life away waiting to LOAD and SAVE programs on Cassette Deck.

Load or Save 8K in approximately 30 seconds! Try it—your Un-Rabbitized VIC or 64 takes almost 3 minutes. It's not only fast but VERY RELIABLE.

Almost as fast as 1541 Disk Drive! Don't be foolish — Why buy the disk when you can get the Rabbit for much, much less!

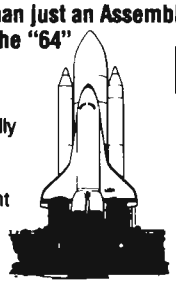
Allows one to APPEND Basic Programs!
Easy to install — just plugs in.
Expansion Connector on rear of the VIC Rabbit.
Works with or without Expansion Memory.
Works with VIC or 64 Cassette Deck.
12 Commands provide other neat features.
Fast Data Files - two data file modes.
Also Available for 2001, 4001, and 8032.



TRAP 65
TRAP 65 is a hardware device that plugs into your 6502's socket. Prevents execution of unimplemented opcodes and provides capability to extend the machines' instruction set.
For PET/APPLE/SYM.
Reduced from $149.95 to $69.95

DC Hayes Smart Modem = $235.00
DC Hayes Micro Modem II = $289.00
Rana Disk Drive - 375
4 Drive Controller - 114

More than just an Assembler/Editor! Now for the "64"



MAE
for PET APPLE ATARI
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New Price $99.95

It's a Professionally Designed Software Development System

Blast off with the software used on the space shuttle project!

- Designed to improve Programmer Productivity.
- Similar syntax and commands — No need to relearn peculiar syntaxes and commands when you go from PET to APPLE to ATARI.
- Coresident Assembler/Editor -- No need to load the Editor then the Assembler then the Editor, etc.
- Also includes Word Processor, Relocating Loader, and much more.
- Options: EPROM Programmer, unimplamented opcode circuitry.
- STILL NOT CONVINCED: Send for free spec sheet!

5¼ INCH SOFT SECTORED DISKETTES

Highest quality. We use them on our PETs, APPLEs, ATARIs, and other computers. $22.50/10 or $44.50/20

EPROMS 2716 = $4.50 2532 = $7.50
Over 40 Commodore Programs by Baker (on 4040) = $25.00

Eastern House
3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446
Send for free catalog!

VISA MasterCard

Circle No. 14

User Clubs

Massachusetts
Masspet Commodore User Group
P.O. Box 307
East Taunton, MA 02718
Contact—David A. Rogers

New Hampshire
TBH VIC-NIC CLUB
P.O. Box 981
Salem, NH 03079
Contact—J. Newman
Publication—VIC-NIC NEWS
Interests—VIC-20 Exclusively

C-64 U.S.E.R.S. (User Software Exchange Resources)
P.O. Box 4022
Rochester, NH 03867
Publication—Companion
Interests—All 64 uses.

New Jersey
Somerset Commodore User's Club
6 Lilac Lane
Somerset, NJ 08873
Contact—Marty Skoultchi
President
(201) 846-2866

New York
JINSAM User's Group
P.O. Box 274
Riverdale, NY 10463
Contact—Nancy Iscaro
(212) 796-6200
Publication—JINSAM Newsletter
Interests—For users of JINSAM Data Managers and the MINI JINI series published by JINI MICRO Systems, Inc. (for all CBM/VIC20/C64)

National VIC Association
9 Crabapple Lane
Nanuet, NY 10954
Contact—Michael Kleinert
(914) 623-8929

North Carolina
Micro-Computer Users Club
P.O. Box 17142
Bethabara Station
Winston-Salem, NC 27116
Contact—Joel D. Brown
Interests—VIC-20 & CBM 64
Newsletter—The "VIC" Connection

Georgia
VIC-DATASWAPPERS
1794 Alabama Ave.
Albany, GA 31705
Contact—David L. Via
(912) 436-5596
Interests—All uses of the VIC-20

Florida
Miami 2064
12911 SW 49th Street
Miami, FL 33175
Contact—Jim Luftman
(305) 226-1185

Kentucky
The Commodore Connection
1010 South Elm
Henderson, KY 42420
Contact—Jim Kemp
(502) 827-8153
Interests—VIC, CBM 64, PET

Ohio
Central Ohio PET User's Group
107 South Westmoor Avenue
Columbus, OH 43204
Contact—Philip H. Lynch
(614) 274-0304
Interests—Support of all Commodore Products

Commodore Youths of Ohio
9729 Lawndell
Navarre, OH 44662
Contact—Todd Archinal
(216) 767-3514
Interests—Commodore Users under 20

SW Ohio VIC Users Club
659 Carthage Avenue
Cincinnati, OH 45215
Contact—Tom E. Harris
761-7510

Indiana
The VIC Indy Club
P.O. Box 11543
Indianapolis, IN 46201
Contact—Linda Kropzer
(317) 876-3342

Michigan
Michigan's Commodore-64 Users Club
14342 Stephens
Warren, MI 48089
Contact—Doug Schwartz
(313) 776-5885 or
Chuck Ciesliga
(313) 773-6302
Newsletter—Sprite 64 (monthly)
Interests—All uses of Commodore 64

South Dakota
VIC-64 Users Club
608 West 5th
Pierre, SD 57501
Contact—Larry J. Lundeen
(605) 224-4863

Illinois
The Fox Valley PET User's Club
833 Willow Street
Lake in the Hills, IL 60102
Contact—Art Dekneef
(312) 658-7321

Chicagoland C-64 Users Club
190 Oakwood Drive
Woodale, IL 60191
Contact—Russ Hurlbut
(312) 860-2015

Vic Users, Salem
306 S. Marion
Salem, IL 62881
Contact—John McConnell
(618) 548-6904
Newsletter—Published in near future
Interests—VIC software library information exchange

Missouri
The Commodore Users Group of Saint Louis
Box 6653
St. Louis, MO 63125-0653
Membership Director—
Dan Weidman
(314) 968-4409 (after 5 pm)
Interests—For all Commodore Users and Educators using microcomputers.
Publication—Monthly 24-page Magazine

Kansas
Commodore Users Group of Wichita
Route 1, Box 115
Viola, Kansas 67149

Nebraska
Greater Omaha Commodore 64 Users Group
2932 Leawood Drive
Omaha, NE 68123
Contact—Bob Quisenberry
(402) 292-2753

Texas
Mid Cities Commodore Club
413 Chisolm Trail
Hurst, Texas 76053
Contact—Garry Wordelman
President

Commodore (Houston) Users Group
8738 Wildforest
Houston, TX 77088

Colorado
Computer Clubs of America, Denver Chapter 1
4979 W. 44th Ave.
Denver, CO 80212
Contact—Office: Jim McTaggart
(313) 455-4200 or
Library: Pat Cummings
(303) 424-8841
Newsletter—CCA Newsletter
Support for New Users—Classes in Microsoft Basic, etc.

California
SFVCUG (San Fernando Valley Commodore Users Group)
21208 Nashville
Chatsworth, CA 91311
Contact—Thomas Lynch
(President)
(213) 889-2211 X2015 Days
(213) 709-4736 Nights
Newsletter—Monthly
Interests—All Commodore Products

Commodore Interest Association
c/o Computer Data
14660 La Paz Drive
Victorville, CA 92392

20/64 Users Group
P.O. Box 18473
San Jose, CA 95158
Contact—Don Cracraft, President
Membership—Thirty
Founded—1983
Meetings—First Sunday, 6 pm
Mercury Savings
859 Blossom Hill Rd.
San Jose, CA
Features—Large library, with copy facilities at local computer store. Discounts of merchandise and a swap/sell period after each meeting.

Amateurs and Artesian
P.O. Box 682
Cobb, CA 95426
Contact—B. Alexander KR6G

Washington
Queen City Computer Club
P.O. Box 19597
Seattle, WA 98109
Contact—Dr. Ted Cooper
(206) 282-3271

A.T.S. VIC-20 Computer Club
7906-34th Avenue SW
Seattle, WA 98126
Contact—Ken Gazaway
(206) 935-2697
Publication—For VIC-20 only

Whidbey Island Commodore Computer Club
P.O. Box 1471
Oak Harbor, WA 98277
Contact—Michael Clark
(206) 675-4815
Donald Sims
(206) 675-0301
Newsletter—Chips 'N Bits

CBM Users Group
803 Euclid Way
Centralia, WA 98531
Contact—Rick Beaber
(206) 736-4085
Special Interests—Programming and sharing ideas.

Central Washington Commodore User's Club
1222 South 1st Street
Yakima, WA 98902
Contact—Bob Wood or
Tim McElroy

Commodore 64 Users
West 1918 Boone Avenue
Spokane, WA 99201
Contact—Terry or Sara Voss
(509) 327-7202

Canada
Winnipeg PET Users
9-300 Ennis Killeo
Winnipeg, Manitoba
Canada R2V 0H9
Contact—Larry Newfeld

Bridge by poking into its special registers to control tempo, note duration, wave shape and more. The package includes sample programs written in easy to read BASIC which shows you how to load and play Note Pro music and tone setting files, or create music and sound effects from within your programs. Note Pro Bridge is interrupt driven. This means that you can add sound and music to existing programs without affecting their execution.

All three packages are documented in detail, and come with sample compositions and tone settings. N.P. I and N.P. Bridge sell for $24.95 on tape and $27.95 on diskette. N.P. II, the full function music editor, sells for $46.95 on tape and $49.95 on diskette. For information contact ELECTRONIC LAB INDUSTRIES, 100 W. 22nd st - box 7167, Baltimore, MD 21218 or phone 301-366-8138.

A GRADE & ATTENDANCE MANAGEMENT PACKAGE

GradeCalc is a grade and attendance management package designed to free the teacher from many of the time consuming tasks of record keeping. Grade filing and reporting are set up in a flexible manner to accomodate any teacher's existing gradebook format.

With GradeCalc the teacher has on file all the raw grades and assignment information. This file can then average grades using a variety of methods. These methods range from percentage scores to symbolic (letter) grades. In addition to averaging, a number of useful reports can be generated. For example, the teacher can easily obtain a cumulative listing of missing assignments. Other reports include grade totals, averages, grade book listings, assignment summaries, and more.

GradeCalc also maintains attendance records in the same flexible manner as grade records. The teacher can recover a variety of reports based on the attendance records. These reports include cumulative totals of all attendance records and problem reports based on excessive absences or other problems.

The GradeCalc package is available on disk for Commodore-64, the 40 or 80 column CBM or PET computer. The price is $29.95.

Contact TAMARACK SOFTWARE, INC., Water St., Darby, Montana 59829, (406) 821-4596 for further information.□

MASTER MATH

PMI, Inc. of Buckfield, Maine has introduced a new software package, MASTER MATH, that is a comprehensive program for teaching high school level math.

High resolution color graphics and games are used to build interest and enthusiasm. MASTER MATH is comprised of six independent discs with 50 specific tutorial or problematic subjects including Algebra, Geometry, Trigonometry, Statistics and Basic Accounting. The program is self-paced and allows the student to determine the most comfortable learning rate.

MASTER MATH sells for $150 (for the entire six disc or cassette package) or $30 per disc, and is accompanied by support materials. It is currently compatible with the Commodore PET, Commodore 64 or CBM 8032.

Additionally, MASTER MATH 4 and/or 5 (which consists of a comprehensive exam package) are available on cassette for the VIC 20.

For more information, contact: PMI Inc., P.O. Box 87, Buckfield, Maine 04220, (207) 336-2500.□

A NEW EXPANSION UNIT FOR COMMODORE VIC-20 PERSONAL COMPUTER

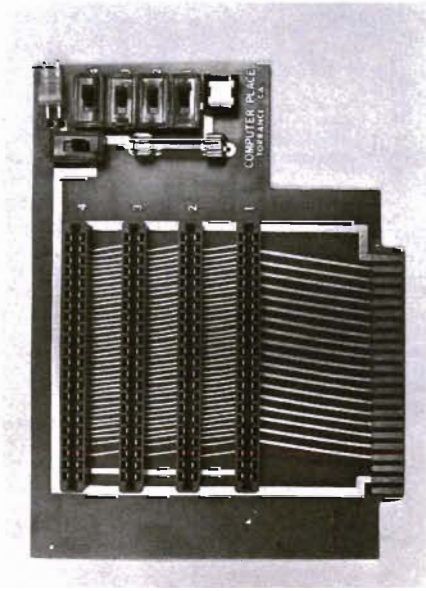
Computer Place has announced the release of a new VIC-20 Expander. It differs from the others as it has such built-in quality features as:

* Four high quality positively keyed connector slots for full memory expansion and utility cartridges.

* Gold-plated contact fingers for solid, long-lasting connection.

* An on-board RESET button that allows the restart of the VIC-20 without turning off the computer.

* Four individual slot ON-OFF control switches which are arranged for easy access and designed with fingertip control rather than pentip.



* An external power supply hook-up provision with a two-way power source switch.

* A fuse block for overload and short protection.

This VIC-20 Expander truly is the one all the VIC users have been waiting for. It incorporates all the features the users have ever asked for. It enhances the VIC-20 computer system for many various applications. It is priced at $54.95.

Contact W. Huang of Computer Place, 23914 Crenshaw Blvd., Torrance, CA 90505/(213) 325-4754.□

"BUSINESS PACK" ON DISK FOR THE COMMODORE 64 AND VIC 20 (8K)

Contained within the software package are the most widely used and popular business utility programs including:

*THE ACCOUNTANT—General Ledger, Income Statement and Balance Sheet

*ACCOUNTS RECEIVABLE/PAYABLE—Journal for current & paid accounts

*THE EDITOR—Full feature word processor

*SPREAD SHEET CALC—Complete spread sheet/calculating program

*BUSINESS INVENTORY—Inventory control system

*CHECKBOOK MATE—Checkbook maintenance and writer

*THE MAILMAN—Address file with sorting

*PLUS 6 UTILITY PROGRAMS¢ Profit Margin Calculator; Business Calendar & Data Base; Program Evaluation Review Technique (PERT); Linear Regression Analysis; Depreciation; and Amortization programs

The software package has full printer capabilities and comes complete with a detailed reference manual including program examples and a hard bound binder. Programming assistance in utilizing the software is also offered during specified hours.

The entire package is now being offered on an introductory basis of $100.00.

Information may be obtained by writing or calling SUPERBYTE SOFTWARE at 2 Chipley Run, West Berlin, New Jersey 08091, Telephone (609) 346-3063.□

Commander's Toll Free Subscription Number is 1-800-426-1830

Commodore 64

HARDWARE AND SOFTWARE

MASS STORAGE:

PETDISK II High Performance FLOPPY DISK for Commodore 64

PEDISK directly transfers data to computer memory. This and the 250000 bps transfer rate means performance up to 10 times faster than a serial bus disk.

Model C340-2 Dual 3'... $995.00 Model C877-1 Single 8'... $1095.00
Model C540-2 Dual 5'... $895.00 Model C877-2 Dual 8' ... $1695.00

80 COLUMN VIDEO:

Screenmaker 80 column VIDEO BOARD..... $179.95
Give the 64 a screen full of characters. Screenmaker gives a complete set of characters (80X24) in a 2K Video RAM. Software to link the system is included.

WORD PROCESSING:

COPY-WRITER Professional Word Processor..... $145.00
The next logical step in the evolution of Word Processors. Copy-Writer has the features found in the best and more. Double columns, shorthand, the works!

COMMUNICATIONS:

COMPACK Intelligent Terminal Package..... $129.95
A complete communications control center – record/read to/from disk – convert files ASCII, BASIC, BINARY, MAE – print incoming data. Complete with software, port board and cable.

LANGUAGES:

fullFORTH+ enhanced fig Forth for Commodore 64... $100.00
Strings, floating point, editor, conditional assembler, interpreter, and more are included in fullFORTH +. Target Compiler is also available for $50.00

KMMM PASCAL for Commodore 64 by Wilserve.... $85.00
One of the newest HL languages, KMMM PASCAL is a true compiler that generates machine code from PASCAL source... FAST! Editor, Compiler, Translator included.

UTILITIES:

Copymaker SINGLE DISK BACKUP ROUTINE..... $30.00
Copymaker allows a 1541 owner to quickly backup an entire floppy disk on ONE DRIVE! Simple swap prompting and full use of memory make this easy to use and essential for any disk owner.

MAE Macro Assembler Editor from EHS..... $ 99.95
MAE has become the standard of the 6502 industry by providing the power and ease of use needed by the best assembly programmers. MAE is a complete development system including a word processor and lots of source goodies.

MICROTECH is your complete 64 center. Dealer inquiries invited.

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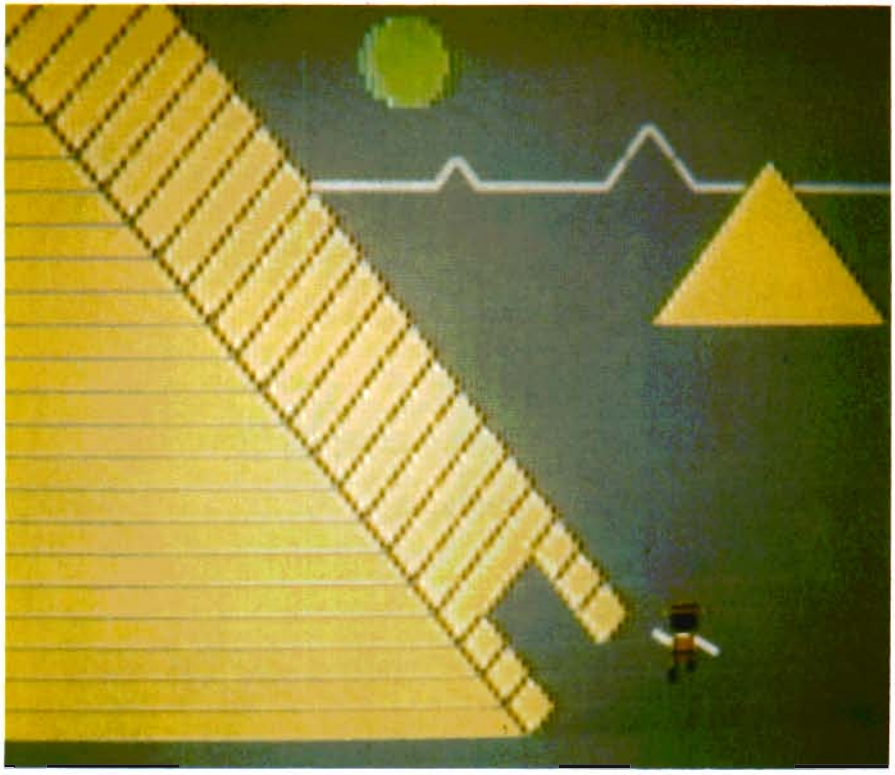
P.O. BOX 102
LANGHORNE, PA 19047
215-757-0284

Circle No. 6

GAME CONTEST



Terms for Game Contest

First prize will be awarded to the person with the highest score. The winning entry must contain a photograph of the highest score of the game along with a ROBBERS OF THE LOST TOMB package front and proof of purchase.

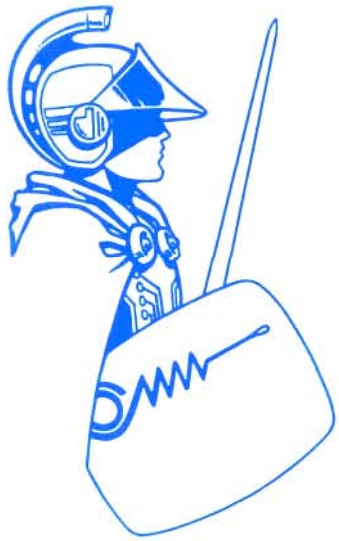
Entries must be mailed to Commander, TIMEWORKS Contest, P.O. Box 98827, Tacoma, WA 98498. All entries must be mailed, as postmarks are required to determine the earliest winning entry. In the event of a tie, duplicate prizes will be awarded. Employees of TIMEWORKS and their families may not participate. First prize will be $100, second prize $50, third prize $25 in merchandise.

The contest will run until November 30.

The Game Contest is a continuing feature of Commander Magazine aimed at providing entertainment for and promoting competition among our readers. TIMEWORKS has graciously provided us with this Game Contest.

DEADLINE FOR ENTRIES NOVEMBER 1, 1983

ROBBERS OF THE LOST TOMB may be purchased from
TIMEWORKS
405 Lake Cool Road
Building A
Deerfield, IL 60015
1-312-291-9200 inside Illinois
1-800-323-9755 toll free outside of Illinois



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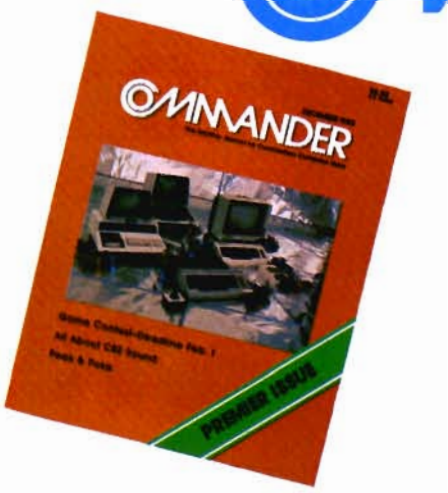

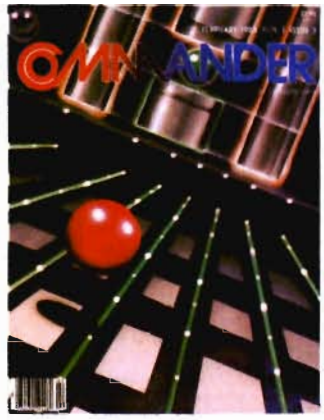

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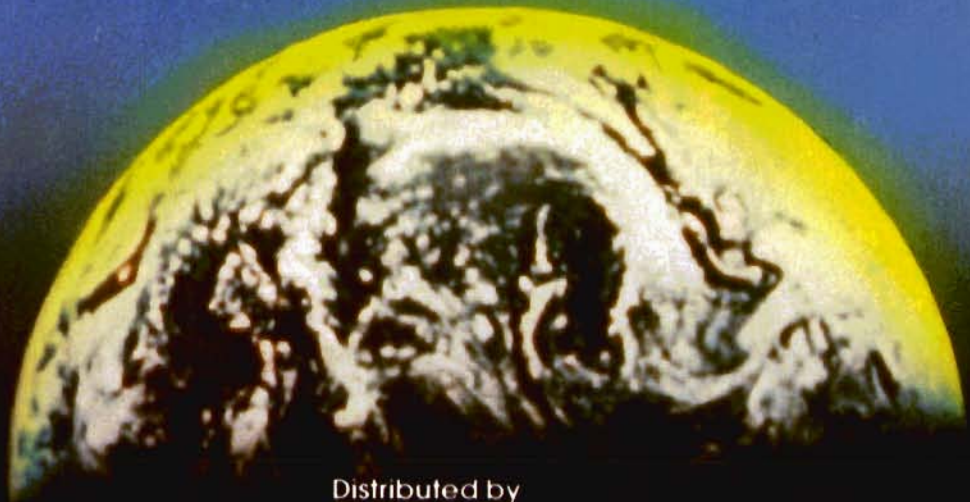

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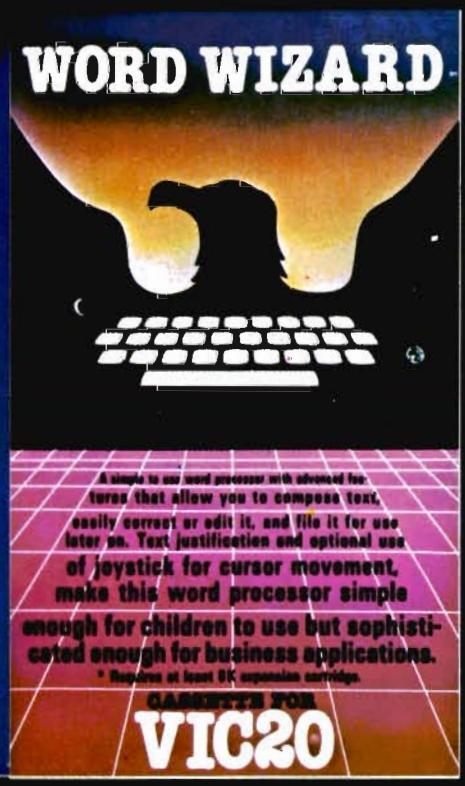
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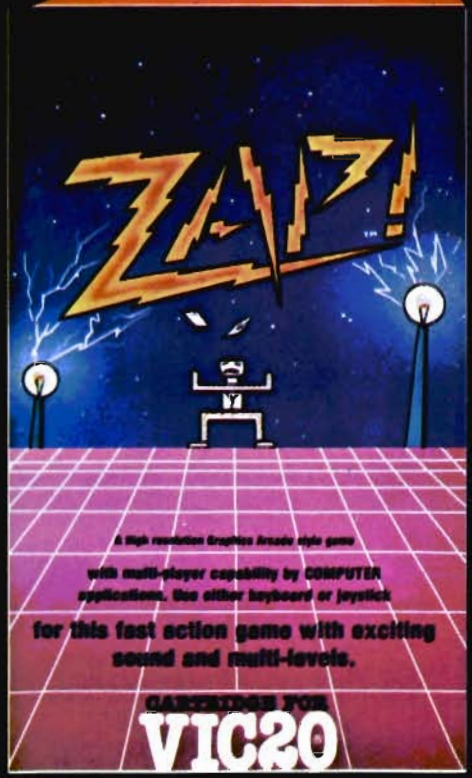
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